9-19-2024 10:00 AM

To stay or move on: Retention of higher education graduates in Canadian regions, 2013-2019

Anthony Abbot Sangmen, *Western University*

Supervisor: Buzzelli Michael, *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Geography

Abstract

This thesis examines the spatial distribution of Canadian postsecondary graduates, focusing on tax years 2016 and 2019, using data from the Postsecondary Student Information System and the T1 Family File. The study tracks the movement and retention of graduates from the 2013-2015 cohorts, analysing thirteen Census Metropolitan Areas (CMAs) with significant graduate populations. Major cities like Toronto, Montreal, and Vancouver attract and retain the most graduates, while intra-provincial mobility is notable within Alberta between Calgary and Edmonton. Ontario cities show strong interconnections around Toronto. The study supports Richard Florida's theory of the creative class, highlighting the economic importance of retaining skilled labour for regional prosperity. Most graduates stay in their study locations, with larger urban centers having higher retention rates. The distance decay factor significantly influences migration choices. This thesis provides valuable insights for urban planning and regional economic development in Canada.

Keywords: Graduate, Talent, Retention, Canada, Postsecondary, Higher Education, University, College, Urban region, Census Metropolitan (CMA)

Summary for Lay Audience

This thesis examines the migration patterns of Canadian postsecondary graduates upon completion of their studies, with a specific focus on their retention patterns. The research endeavours to analyse data from tax years 2016 and 2019 pertaining to graduates from the years 2013, 2014, and 2015, with the objective of comprehending trends in the geographical preferences of where graduates choose to live and work.

The key findings indicate that major urban centres such as Toronto, Montreal, and Vancouver are the preferred destinations for graduates to reside in or relocate to. These cities provide a multitude of employment prospects and dynamic lives, rendering them appealing to young professionals. Nevertheless, significant interprovincial migration occurs, particularly in Alberta between Calgary and Edmonton, as well as inside Ontario with strong movements around Toronto.

The study highlights the significance of retaining highly trained graduates to foster regional economic growth. Cities that are able to retain their graduates experience the advantages of having a highly educated labour force, resulting in increased salaries and improved economic circumstances. This is consistent with the idea that regions with a higher concentration of educated and innovative individuals tend to have more economic prosperity.

Curiously, the majority of graduates have a tendency to stay in the location where they pursued their studies. The closer the new job opportunities are to their original location, the more likely they are to move there. This pattern, known as the "distance decay factor," shows that distance plays a big role in graduates' decisions to move.

In general, the thesis sheds light on the influence of graduates' decisions regarding their residential and occupational choices on various regions in Canada. This knowledge is vital for policy makers and city planners who seek to establish environments that effectively attract and retain young talent, hence enhancing local economies.

Acknowledgement

I express profound gratitude to my supervisor Prof. Michael Buzzelli, whose unwavering support has played a crucial role in the successful completion of this thesis. Your academic mentorship, motivation, and comprehension have been priceless, and your commitment made the process considerably more seamless. I am immensely grateful for your guidance and the myriad of ways in which you have supported and enhanced my work.

I would like to express my sincere gratitude to Lori Johnson, the graduate administrator, for her unwavering support and invaluable assistance for the past two years. I am grateful for your invaluable assistance in managing the administrative elements of my education. Your devotion and friendliness have been greatly appreciated.

I would like to express my appreciation to Prof .Godwin Arku, the Graduate Chair, for his substantial assistance during this process. Your support and counsel have been an immense reservoir of fortitude.

I would like to express my gratitude to Shane Goodwin for his invaluable support in the Research and Development Centre (RDC) throughout the time I was analysing my data. I deeply appreciate your indispensable assistance and I am sincerely appreciative for your valuable efforts. Big ups to you!

A special note of thanks to Prof. Isaac Luginaah for his support and encouragement over the past two years. Your positive encouragement has been a great source of motivation, and I deeply appreciate your contributions.

To the dear students and faculty members of the department, thank you for your support in various ways. Your camaraderie, collaboration, and intellectual exchange have enriched my experience and made this journey possible!

I am deeply grateful to my parents for their steadfast support and their lifelong dedication to my education. The love, sacrifices, and encouragement you have provided have been the fundamental basis for my accomplishments, and I am eternally appreciative of your unwavering faith in me.

I would like to express my gratitude to the departmental staff at the Department of Geography and Environment. I am grateful for your commitment since your assistance have been crucial in shaping my academic journey. I am thankful.

Finally, I express my gratitude to the omnipotent God for His divine guidance and abundant benefits. I have reached this point in my life due to the benevolence of a higher power, and for that, I am forever appreciative.

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1

1.1 Introduction

In the past few decades, there is a widespread debate among individuals in society on the significance of universities and higher education in the present age (Barnett, 2004; Fallis, 2007). In the past few centuries, the institution has implemented proactive measures to overhaul its engagement with society. According to Florida et al., (2006), the university plays a crucial role in driving innovation and, consequently, economic prosperity. They argue that in the current era of a knowledge-based economy, the economy plays a crucial role in society, particularly in the development of highly trained workforce and the establishment of high-tech companies that stimulate economic growth. Etzkotwitz, a prominent scholar, has supported Florida's works on the significance of the university, along with other proponents. Etzkowttz, (1989) contends that the university, traditionally focuses primarily on research and teaching, has been replaced by an increasingly “entrepreneurial university”. This new type of university generates income and improves its political standing by transferring technology, commercialising innovation, creating spinoff companies, and actively participating in regional development. These concepts draw significant inspiration from the Silicon Valley and the Greater Boston area, mostly because of the prominent presence of Stanford University and MIT, respectively, in the United States. The Waterloo University in Canada likewise aligns with these ideas (Bramwell & Wolfe, 2008).

The location preferences of these talented individuals, who have received training from postsecondary institutions, play a crucial role in determining where they decide to reside (Darchen & Tremblay, 2010). According to the creative class theory, Florida argues that diversity and tolerance are the primary elements that attract talented individuals to a certain location (Florida, 2002). However, certain academics argue that it surpasses the scope of Florida's proposition (Peck, 2005). In a time when cities compete fiercely to retain the most skilled individuals inside their boundaries. The growing importance of cities and their leadership in addressing this issue has become a prominent subject of discussion among city authorities. City leadership has actively participated in university and college boards to advance the agenda (Massey et al., 2014). As a result of the increasingly ageing Canadian population and the decreasing rates of childbirth, cities

must explore two options to address their labour needs: attracting talented workers from other regions within Canada or recruiting internationally.

Generally, a region that keeps a significant number of its own graduates but is unable to recruit individuals with degrees from other regions is likely to lag behind (Florida et al., 2006). Regions have implemented institutional collaboration between universities and industries to foster the development of advanced technology and build intellectual ecosystems. This strategy aims to encourage students who have studied in the region to remain there, while also attracting talented individuals from other areas. Given that talents have a crucial role in determining the overall economic health of a region. One may be tempted to ask, why do cities care? A study noted that the departure of highly talented individuals, whether immediate or delayed, has negative consequences: the loss of above-average skills and earnings hampers economic growth and increases the tax burden for the remaining city residents (Böckerman & Haapanen, 2013). It is crucial to analyse the retention rates of different cities in order to evaluate their effectiveness in maintaining students after they graduate.

Because of time limitations, the study was unable to determine the origin of these graduates who came to the university region, therefore excluding the aspect of attraction from the study. The scope of this study was to examine the ability of university areas herein Census Metropolitan Areas (CMAs) in Canada to retain their graduates, with a particular emphasis on larger and medium-sized cities.

1.2 Research Problem

Local economies have benefitted greatly from human capital (Faggian et al., 2017). However, many regions in Canada, particularly midsized and small cities, have seen difficulties in retaining a highly qualified workforce (Beckstead et al., 2008). Moreover, there is data indicating that individuals residing in less urbanised areas tend to relocate to urban regions with abundant job prospects and higher salaries after acquiring post-secondary education and training (Zarifa et al., 2019). As a result, many cities have seen brain drain, while larger cities have reaped the benefits. Many small and midsized regions often rely on universities as a means to attract and retain the skilled workers they train (Dotti et al., 2013). However, relying solely on the appealing qualities is insufficient to keep these highly skilled workers. Additional efforts are required, such as seeking help

from local governments and other formal and informal organisations, in order to develop the essential strategies to accomplish this mission.

Thus far, research has examined the mobility patterns of postsecondary graduates among Canadian provinces (Narh & Buzzelli, 2022). To the best of my knowledge, no studies have been undertaken specifically at the CMA level. To clarify even more it is important to document how the migratory flows of graduates actually occur at the CMA (Census Metropolitan Area). Examining the attraction and retention patterns at the CMA level is crucial for policy makers to develop effective strategies to address the outflow of highly trained workers, which hinders economic growth.

This thesis aims to document the retention rates of the top thirteen Census Metropolitan Areas (CMAs) in Canada using a quantitative matrix. The objective is to address the existing gap in the literature by providing a statistical perspective on this topic. In order to address the existing research gap, I propose the following question:

What spatial patterns emerge in the post-graduation trajectories of postsecondary graduates?

1.3 Research Objectives

Based on the research question, the study seeks to:

i. Document where students go post graduation in Canada.
ii. Reckon the retention rates of students in the various Census Metropolitan Area (CMAs) post graduation.

1.4 Research Design

In order to successfully achieve the research objectives mentioned earlier, the study utilised a quantitative technique in its methodology. The study selected two out of the three datasets available in the Education and Labour Market Longitudinal Platform (ELMLP) from Statistics Canada. These datasets are the Postsecondary Information System (PSIS) and the T1 Family File (T1FF) datasets. The reason PSIS was selected is because it is a compulsory survey administered by multiple public universities across the

country, thereby supplying the necessary student data needed to address the research subject matter. Conversely, the T1FF dataset offered a reliable method to track students' progress after graduation, as it contained details about their tax filings. The study employed the T1FF as a proxy to find the residence of students post graduation. To benefit from these datasets and achieve the intended outcomes, the datasets were merged and utilised to create quantitative matrices for the tax years 2016 and 2019. This study aimed to do a one-year and four-year follow-up of students after their graduation.
Only thirteen of the CMAs were shown in the findings, while the other ones can be found in the Appendix section. The thirteen CMAs with the greatest flows were selected based on their compliance with Statistics Canada's vetting guidelines. However, the remaining CMAs were unable to comply with the vetting guidelines unless some cells were merged to reach the minimum count.

The subsequent sections of the thesis examine the literature review, methodology, results, discussion, and conclusion of the research.

Chapter 2
Literature Review

2.1 Introduction

This chapter provides an overview of the research pertaining to the post-graduation movement of graduates following their completion of studies in Canadian higher education studies. It provides the gaps in the existing literature regarding the overall behavioural patterns of graduates and offers insights into why students choose to relocate or remain in specific regions after completing their postsecondary education. Furthermore, it underscores the importance of higher education institutions engaging in collaboration with other institutions in order to retain the highly educated workforce that has been trained in their own regions. Section 2.2 presents the importance of human capital in the modern economic landscape. Section 2.3 reviews the graduate mobility literature of the decades. Section 2.4 highlights the concerns of local economic development and the university. Section 2.5 the significance of regionalism for regions' overall economic health. Section 2.6 explores the implications of distance to access higher education. Section 2.7 focuses the importance of job opportunities and their impact on graduate mobility. Section 2.8 discusses the effects of amenities on graduate mobility and locational preferences. Finally, section 2.9 focuses on graduate retention and section 2.10 centers on municipal retention strategies.

2.2 Theoretical Framework

2.2.1 Human Capital

Human capital, in its simplest form can be defined as a population that possesses at least a bachelor's degree (Florida et al., 2006). Some academic hypotheses assert that occupation, rather than education, is a more reliable measure of human capital. According to Florida et al. (2008), proponents claim that working on employment offers valuable experience, creativity, intelligence, and entrepreneurial skills that cannot be solely obtained from education. Additional research corroborates the claim that occupation plays a significant role in developing knowledge that is advantageous to the local economy (McGranahan et al., 2011). Additional evidence indicates that certain types of knowledge bases generated stimulate more economic growth compared to others (Asheim and Hansen, 2009). The competence of the workforce has increasingly become a

crucial factor in the success of developed countries, and skilled workers are not limited to certain geographic locations but rather found across a vast area (Faggian & Mccann, 2009). The importance of a highly qualified workforce is a central focus in academic discourse about the growth and development of a region. In 2021, around 73.7% of Canadians live in the primary urban areas of the country (Statistics Canada, 2022). According to Polese and Shearmur (2006), individuals residing in these large metropolitan areas tend to possess higher average earnings and experience more rapid income growth compared to those living in smaller urban and rural areas. Human capital is generally developed through the acquisition of education and expertise (Beckstead et al., 2008). Human capital has played a crucial role in the development of cities and has been a significant contributor to wage inequalities (Beckstead et al., 2008). The creative class refers to a group of people who participate in complex problem-solving tasks that demand a substantial level of independent decision-making and a considerable amount of education or human capital. The occupations that fall under computer and mathematics, library, architecture, life, social and physical sciences, education and training, arts and design, entertainment, sports and media, as well as other highly skilled and knowledge-based fields such as legal positions, management occupations, technical jobs, healthcare practitioners, and business and financial services/operations are all included (Florida, 2002). According to the concept of human capital, Florida emphasises that the economic success of a region is linked to the presence of creative individuals, as well as the existence of a university or college and a tolerant environment, all of which contribute to stimulating growth. Innovation, diversity, and tolerance are crucial elements that draw in creative individuals who make valuable contributions to the progress of local economies. Peck, (2005) highlights the shortcomings in Florida's (2002) creative class theory, which leads to competition between cities and the gentrification of metropolitan areas as regions strive to attract highly skilled workers. According to Beckstead et al., (2008), personnel in knowledge-intensive businesses have diverse perspectives on location and career choices. For example, architects often choose to move to Toronto in order to benefit from the abundance of opportunities for gaining experience and building professional connections within the city's concentration of architectural firms (Gertler et al., 2014). Upon completing their school, graduates typically choose either work or entrepreneurship (Marzocchi et al., 2019).Some individuals choose to pursue entrepreneurship due to

limited opportunities in traditional employment (Poschke, 2013). When graduates establish their own firms, they not only contribute to economic growth but also play a crucial role in retaining graduates (Kitagawa et al., 2022).

In the past two decades, the creative class has been a subject of debate among urban research scholars. Nonetheless, the creative class has faced significant criticism. Peck observes that the creative class contributes to urban gentrification and exacerbates urban inequality. The creative class will displace the urban poor. Similarly, Florida himself observed that increasing inequality and unaffordable housing contribute to the migration of talent from urban areas which were to be concentrated with talents to promote economic growth (Florida 2017). Florida and Peck contend that gentrification initiated by affluent individuals displaces the creative class from urban areas (Florida 2017; Peck 2005). Kozina and Clifton (2022) note that the creative class is relocating from densely populated cities to those with lower population density. Other evidence challenges the aggregation of occupational groupings within the creative class (Krätke, 2010). Krätke also agrees with Markusen for the disaggregation of occupational groups. Markusen asserts that these occupational groupings have different urban preferences and their corresponding impacts on the urban environment exist (Markusen, 2006). Some argue that while Florida's analysis excluded low-wage workers, these individuals played a crucial role in sustaining the city's infrastructure, thereby supporting members of the creative class (Storper & Scott, 2009). Other evidence critiques the creative class theory and specifically attributes its effectiveness to regions with large geographical size and population, such as the United States, while denying its applicability in Europe (Hansen and Niedomysl, 2009). Clifton (2008) observes that the literature on the creative class is predominantly consistent in the UK, with significant exceptions regarding technology-based employment growth.

2.3 Graduate Mobility

Graduates are likely to relocate for many reasons. Possible factors influencing individuals' decisions to relocate include wage and employment prospects, the cost of living in the area, amenities and quality of life, and their household and family situation (Corcoran & Faggian, 2017; Winters, 2012). Furthermore, certain factors such as ethnicity, marital status, and prior migration are taken into account by certain individuals

(Corcoran & Faggian, 2017). Bohemian graduates, as defined by Florida, are likely to go back to their home region (Faggian et al., 2014). According to Haapanen & Tervo, (2009), graduates who moved away from home in the first few years after graduation were more likely to relocate compared to those who stayed at home. However, in Finland, this issue applies to the length of time university graduates remain in the region of studies. Also they found that the majority of graduates tend to remain in the same geographical area where they pursued their studies for a period of 10 years after graduation. However, Haapanen & Tervo, (2012) observed notable variations between regions. Specifically, they showed that graduates from universities located in growth centres were more inclined to stay in these regions compared to graduates from universities in peripheral regions.

During the mid-1970s to early 1980s in Canada, there was a significant trend of English speakers leaving Quebec, while at the same time, there was an increase in the number of French speakers migrating to Quebec from other provinces (Liaw, 1990; Narh & Buzzelli, 2022).

Additionally, several individuals choose to remain in the geographical area where they pursued their education due to the social networks they have established during the years (Corcoran & Faggian, 2017; Winters, 2012). Nevertheless, several graduates opt to return to their hometowns, primarily motivated by familial connections, particularly in rural regions (Crescenzi et al., 2017). Certain graduates may choose to relocate or remain in a particular area due to its affordable cost of living and comparatively low crime rate (Glaeser, 2004). Additionally, it is important to mention that while all of these factors impact graduate mobility, some individuals choose to relocate in order to pursue further education, particularly in specialised programmes that are directly related to specific employment opportunities they are aiming in the future (Abreu et al., 2014).

Research shows that women in the United Kingdom tend to be more mobile than men regarding their career choices and movements after graduation (Faggian et al., 2007). Furthermore, it has been observed that women in STEM have a higher degree of mobility compared to other demographic groups (Narh & Buzzelli, 2023). This likely indicates their post-graduation activities as well. However, in Italy, there is a distinct trend where

men are more inclined to migrate after completing their education, in contrast to women. The main cause can be mostly attributable to cultural factors (Ballarino et al., 2022).

Higher education institutions (HEI) play a major role in producing a highly competent workforce. As providers of human resources, they are vital for the advancement of any progressive society. According to Haapanen & Tervo, (2012), regions that have a HEI experience economic advantages compared to regions that do not have HEI. According to literature, the existence of human capital in a local economy improves productivity and stimulates regional economic growth (Kitagawa et al., 2022; Valero & Van Reenen, 2019). However, evidence from Canada suggests a weak correlation between universities, regional GDP, and technology (Florida et al., 2010). However, in Sweden, universities are considered crucial for the economic development of the regions where they are located (Mellander & Florida, 2006). It is difficult to determine the current situation in both countries, as additional research will be necessary to gather more information.

Higher education institutions have an honest commitment for the success of their graduates. However, they demonstrate minimal concern regarding the origin and post-graduation location of their students (Groen & White, 2004). Higher education institutions provide a diverse array of programmes. Programmes can be divided into two main categories: STEM and non-STEM disciplines. The non-STEM fields include Business, Humanities, Health, Arts, Social Education (also known as BHASE), as well as legal studies, trades, natural resources, and conservation (Statistics Canada, nd). For instance, the areas of Kitchener-Waterloo and Saskatoon have shown proficiency in attracting and maintaining graduates who specialise in STEM fields (Bramwell & Wolfe, 2008; Phillips & Webb, 2014). Graduates in the latter field frequently take the initiative to form firms, which is beneficial for regional development as it helps to retain a portion of the highly skilled workforce (Benedict et al., 2012; Breznitz & Zhang, 2020). According to Asheim and Hansen's analysis, certain knowledge base specialties are associated with higher rates of job growth compared to others (Asheim & Hansen, 2009). This approach promotes a higher likelihood of retaining graduates (Abel & Deitz, 2012). Studies have shown that the majority of graduates relocate to areas where they can find job prospects after finishing their education (Hansen & Niedomysl, 2009; Lepawsky et

al., 2010). Hence, a region's ability to provide employment opportunities will increase their chances of staying after completing their studies. Nevertheless, several graduates encounter difficulties in obtaining employment that aligns with their level of education. These graduates are likely to move to regions where they can get jobs that align to their level of education. Consequently, they are compelled to relocate to major urban centres in pursuit of more favourable job prospects that correspond to their expertise (Abreu et al., 2015; Winters, 2011). However, when these graduates choose to reside in the locations where they studied, they frequently get lower financial remuneration compared to their peers who relocate elsewhere (Winters, 2012). Occasionally, these graduates may choose to pursue employment in positions that require a lower level of education (Winters, 2012).

2.4 Local Economic Development and the University

A decrease in population in a region can have an adverse effect on its economic progress, and the departure of educated residents is particularly worrisome due to its impact on the utilisation of technology and the synthesis of knowledge, which are less common in rural areas (Artz & Yu, 2011). Local economic development can be achieved through the collaboration of key local stakeholders, including entrepreneurs, legislators, financiers, researchers, and community organisations. This collaboration aims to create an environment that promotes innovation, entrepreneurship, and economic growth. The advantages of locally-driven initiatives and collaborative action are apparent (Andrew & Doloreux, 2012; Polese & Shearmur, 2006). Institutional collaborations at the local economic level, whether they are formal, informal, or a combination of both, have the ability to stimulate local growth (Leibovitz, 2003). Recent examples of partnerships include: (a) " strategic agreement between the London Municipal Council and the University of Western Ontario, where the Mayor of London now serves on the university's board of governors; (b) the Town and Gown Committee of the City of Waterloo, consisting of representatives from the cities of Waterloo and Kitchener, as well as the University of Waterloo and Wilfred Laurier University" (Massey, 2014,p 153). Overall, the promotion of university-industry interactions can be achieved through academic engagements. However, it is also important for firms to possess the necessary skills to initiate and sustain such collaborations (Perkmann et al., 2013). Moreover,

intellectual vigour can be attained by the active involvement of university scientists and researchers in both formal and informal knowledge networks, where ideas and analysis are examined and evaluated by other stakeholders in the region (Martinez-Fernandez & Sharpe, 2008). Perkmann et al., (2013) discovered that universities will only engage in these activities if they perceive them to be advantageous. Moreover, scholarly literature suggests that the presence of a local government and a local institution exerts a significant influence on the creative core, including scientists and engineers (Zhao et al., 2020). This phenomenon can also be ascribed to the symbiotic relationship between universities and industries, which local governments can facilitate to stimulate local economic expansion. This, in turn, results in the creation and preservation of high-tech employment opportunities for the highly educated workforce. In their study, they discovered that regions that solely rely on using the university as a magnet are unable to retain students after they complete their studies (Dotti et al., 2013). Additionally, they stated that many graduates will depart if they encounter more favourable prospects outside the region.

The ability of a university to attract individuals and corporations does not guarantee its ability to retain talented professionals in the long run, (Florida et al. (2006).This scenario can only occur when these graduates go to develop startups as a consequence of their education or engage in collaboration with faculty members due to the relationships they formed with said faculty throughout their studies. Another potential benefit is the ability to obtain employment within the local economy where these schools are situated. Nevertheless, several areas like Waterloo have successfully attracted enterprises that are typically associated with the nearby postsecondary institution (Bramwell et al., 2008). According to Florida's creative class idea, businesses cluster to benefit from the presence of highly skilled workers (Florida, 2002).Nevertheless, some studies indicate that the majority of highly qualified individuals relocate to larger urban areas or cities due to the availability of higher incomes or salaries, and job prospects (Beckstead et al., 2008; Berry & Glaeser, 2005). Recently, scholarly works have anticipated that the high cost of living in certain areas may lead to the migration of highly trained workers to more affordable locations (Abel and Deitz 2012; Florida 2017). Fiore et al., (2015) discovered that college-educated graduates considered the cost of living and a robust local economy as

the foremost factors when deciding to remain in a specific location. The study found that economic factors were the most prominent, followed by quality of life. In contrast to Florida's (2002) thesis, where Florida argues that tolerance was one of the three most important factors highly trained individuals examined when deciding to move or remain in a certain location. In their study, they determined that racial diversity and the homosexual index were rated 27th and 37th, respectively (Fiore et al., 2015). Furthermore, Glaeser (2004) also corroborated this assertion.

Academics also argue that the size of a city is significant in determining the ability to keep graduates and, in certain instances, the impact of the institution on the surrounding area. Goldstein & Drucker, (2006) argue that the impact of the university is more pronounced in a mid-sized city compared to bigger metropolitan areas. Furthermore, research conducted by Lepawksy et al., (2010) indicates that the size and geographical position of St John's in Newfoundland are significant factors in its ability to attract and retain college-educated graduates. Similarly, there is research indicating that the creative class theory is more effective in nations such as the United States, where there is a significant number of large metropolitan centres that can facilitate the development of the creative class. However, in countries such as Canada and Sweden, the presence of fewer cities poses a challenge in supporting the creative class, therefore producing an imbalance in the theory based on geographical location and population size (Hansen & Niedomysl 2009; Lepawsky et al., 2010).Additional literature indicates Florida's theory did not effectively function in the Canadian setting (Shearmur, 2007).

2.5 Regionalism

With the increasing prevalence of the neo-liberal economic model and the rise of knowledge-based industries, it is crucial to recognise that human capital remains a fundamental catalyst for economic growth. The service sector is dominant in most modern economies and drives economic growth (Ley & Mutton, 1991). In previous eras when the manufacturing sector held a dominant position in the economy, workers resided in close proximity to industrial facilities or in areas abundant with natural resources. This allowed for direct access to raw materials, which were essential for the functioning of factories. As a result, there was little migration to urban areas. However, the prevailing situation shifted, prompting a migration of the population into metropolitan areas due to

the closure of factories. Consequently, there was a significant influx of people moving from one region to another, prompting the government to implement policies aimed at minimising disparities in opportunities and development results between different regions (Bradford & Bramwell, 2016). There was an overall consensus that only government policies and actions held the ability to address the situation. The government's engagement led to the implementation of relocation policies that specifically focused on individual companies by offering them incentives to reduce costs, such as assistance, loans, and tax incentives. These policies were accompanied by further public expenditures in regional infrastructure, particularly in transportation. The top-down method to achieving equitable development was soon found to be ineffective (Rodríguez-Pose, 2013).

Soon Bradford & Bramwell (2014) argue that globalisation and technological improvements have led to substantial transformations in urban economies. They claim that effectively regulating modern cities while also maintaining their economic sustainability and social inclusiveness is an immense problem. Unsurprisingly, competition from within and/or outside (sometimes due to globalisation and advanced technological change) impedes the economic progress of certain places. However, it is essential to develop these regions in order to facilitate a more equitable distribution of wealth. In order to achieve this, it will be necessary to ensure that all types of capital are distributed evenly or at least somewhat evenly throughout the country. Due to Canada's extensive land area and relatively tiny population, it is difficult, if not impossible, to evenly distribute resources. Consequently, Canada has one of the smallest population sizes globally (Guo & Fast, 2019). Moreover, the country exhibits a high level of urbanisation, as seen by over 80% of its population residing in urban areas (Statistics Canada, 2017). Empirical evidence has shown that firms and start-up activity tend to cluster in urban areas that possess a favourable combination of human capital, amenities, and institutional infrastructures. These places, tend to have strong research and universities, entrepreneurial assistance, and high levels of collaborative capacity for corporate strategy, enjoy significant advantages over those that lack these characteristics (Bradford & Bramwell, 2016).New Regionalism has emerged as a result of research, application, and interaction among a diverse community of researchers, practitioners, and

decision-makers in governments and communities. This development has been influenced by lessons learned from the past. (Bradford & Bramwell 2016; OECD 2011).Regional Development Agencies (RDAs) were founded since the 1980s with the purpose of tailoring policies to suit the specific needs of different areas. Leadership from these Regional Development Agencies (RDAs) have participated in associational unions with other stakeholders. In order to carry out its instructions, each RDA utilises different policy instruments, resulting in specific to the region outcomes (Bradford and Bramwell 2016). This has demonstrated a moderate level of effectiveness after several decades of existence. According to Martinez-Fernandez & Sharpe (2008), simply constructing institutional infrastructure such as research centres or industry incubators is not enough to promote knowledge and intellectual development in a region. However, by engaging in networking and collaborations both locally and internationally, the practical value of the knowledge generated may be fully realised.

According to Amin's (1999) findings, economic sociology suggests that economies are created by society and that economic behaviour is influenced by social networks. Furthermore, Amin & Hausner (1997) contend that policy initiatives that give priority to the promotion of associational networks are more advantageous than those that exclusively concentrate on individual actors. This is also consistent with the ideas of Martinez Fernandez & Sharpe (2008). These policies have the ability to create larger groups of people and encourage more interactions, hence promoting growth. Hirst (1994) argues that effective economic governance extends beyond the control of government and market institutions, and instead focuses on policies that promote a wide variety of independent groups. Moreover, this situation creates clusters and fosters a network of regional interdependencies. The prominence of intellectual individuals and organisations in the idea of regionalism is apparent from the occupational distribution of the available employment (Amin, 1999). It is important to acknowledge that employment is the primary factor influencing the retention of graduates. This can only be achieved when the local economy is booming. Graduates who engage in entrepreneurial activities, as previously said, possess the ability to attract and retain both graduate entrepreneurs and graduate employees from local higher education institutions (HEIs)(Kitagawa et al., 2022).

2.6 Distance to Access Higher Education

Greater distances to higher education institutions have been shown to hinder access to higher education. 35% of Canada's population resides at a distance of over 40km from a university (Frenette, 2006). In addition, Frenette (2006) observed that individuals who reside farther from a university are less inclined to pursue educational opportunities. This is further supported by the study conducted by Ballarino et al., (2022) in Italy, which found that there was a widespread belief that students had to travel greater distances in order to attend higher education institutions. However, it was discovered that students had a preference for accessing education that was in close proximity to their location. Sá et al., (2004) also discovered that the quality of educational programmes in the Netherlands does not have a substantial impact on student mobility behaviours. However, they find that students are discouraged by the distance and high rental costs. However, others argue that students who go larger distances to pursue higher education do so because there is no higher education institution available in their nearby region, while others do so because of the unique attributes of a specific programme being offered (Sá et al., 2004). One of the main reasons why students prefer to travel lesser distances to access university education is because of the financial expense (Frenette, 2006). However, the findings indicate that distance has a distinct impact on ambitions and achievement, over socioeconomic position and academic ability (Parker et al., 2016).

2.7 Employment Opportunities

Typically, the literature indicates that work prospects drive the migration of graduates once they have finished their studies (Hansen & Niedomsyl 2009; Lepawksy et al., 2010). However, Florida argues that towns should prioritise wooing the creative class in order to attract businesses that require the skills and expertise of creative workers (Florida, 2002). Recent research indicates that a more accurate understanding emerges when jobs are categorised into two groups: smart jobs, which include creative class employment and individuals with postsecondary education, and main jobs, which include non-creative professions and individuals with lesser levels of education. The results indicate a high bidirectional causality between main jobs and smart jobs (Østbye et al., 2018). Furthermore, Nathan (2008) expressed a contrasting viewpoint to Florida's assertion that

jobs followed individuals. He advised skilled workers to pursue employment opportunities with the goal of achieving higher career prospects, and cautioned city officials against relying solely on innovation and trendiness for urban development. Recent graduates are drawn to thicker labour markets and greater financial rewards (Ahlin et al., 2014).This trend drives individuals to take up residence in densely populated metropolitan areas (Beckstead et al., 2008). Moreover, employment has a tendency to make graduates travel longer distances for work (Newbold, 2017). However, Newbold (2017) discovered that graduates were more inclined to remain in the region where they pursued their studies if their degree was in line with the part-time employment they undertook while enrolled in school. Additional research indicates that graduates exhibit a significant inclination to remain in the same geographical area following their completion of studies (Liu et al., 2017). However, when individuals choose to move, it is primarily driven by the prospect of higher income that they are expected to earn in other locations (Liu et al., 2017).

2.8 Amenities

Gyourko & Tracy (1991) provide a definition for a "pure amenity as a non produced public good such as weather quality that has no explicit price. In practice, previous empirical studies include some government services such as education and public safety". Amenities can be classified as either natural, which may be limited to a specific area, or man-made, which can either enhance or diminish the appeal of a location to a population (Whisler et al., 2008). Consumption amenities have a role in determining the general quality of life in an area, whereas production amenities impact the total productivity of the area (Albouy et al., 2013). Consequently, certain regions have become more desirable than others. According to the first estimates of company productivity in tradeables for Canada, Toronto is the most productive Census Metropolitan Area (CMA) in Canada, followed by Calgary, Oshawa, Vancouver, and Ottawa-Hull (Albouy et al., 2013). This literature aligns with individual migration preferences, indicating that young, highly educated households, regardless of marital status, aim to move to regions with better business conditions or productive facilities (Chen & Rosenthal, 2008). More evidence indicates that individuals with a college education are more likely to relocate to a certain location based on work prospects rather than the facilities available in that place

(Darchen & Tremblay, 2010; Hansen & Niedomysl, 2009). Nevertheless, certain academics contend that this assertion does not hold true across all levels of education. Specifically, individuals who have obtained a doctoral degree are more inclined to be influenced by factors related to quality of life, such as weather and crime rates, rather than economic factors like job growth and the presence of information technology jobs (Gottlieb & Joseph, 2006). Further research indicates that local economic development corporations, which promote industrial and infrastructural growth, have a beneficial impact on reducing unemployment rates in cities. However, these organisations do not have any influence on improving the overall quality of life in those areas (Jarmon et al., 2012). In the United States, Reese (2012) argues that prioritising quality of life is crucial for attracting and retaining graduates in any place, surpassing other metrics. However, (Andersen et al., 2010a) argue that work possibilities should take priority above the quality of life or people climate. They found that the Nordic countries had a robust social system that could provide for such facilities, whereas the United States had a weak or negligible welfare system to sustain its human capital. Nevertheless, the Danish creative class is drawn to the appealing characteristics of soft city qualities, cultural activities and a high level of tolerance towards migrants, particularly those from non-Western nations (Lorenzen & Andersen, 2012).

Furthermore, as graduates mature or establish their families, they often seek locations that provide essential amenities for raising a family. Factors that can differ include the safety of the area, the length of commutes, the quality of schools, and the availability of child care services (Glaeser 2004; Lorenzen & Andersen, 2012; Reese, 2012; Whisler et al., 2008). (Andersen et al., 2010b) suggests that human capital is mostly drawn to larger cities, while other evidence also suggests that human capital is strongly attracted to the natural amenities found in rural places (Mcgranahan & Wojan, 2007). Furthermore, it was shown that the human resources residing in rural locations tend to be older and married compared to their counterparts in urban areas (McGranahan & Wojan 2007). In contrast, to Florida's (2002) argument, McGranahan & Wojan (2007) argue that Florida may have skewed his sample by including a disproportionate number of young graduates who are more inclined to appreciate the amenities offered in densely populated urban areas, such as music concerts and restaurants.

Tolerance is a crucial factor in supporting and fostering the creative class, which is vital for the development of regions (Florida, 2002). However, evidence demonstrates that in smaller towns, the quality of life has a greater influence on attracting and retaining talented individuals compared to tolerance (Grant & Kronstal, 2010). Furthermore, a study conducted in Dutch cities revealed that tolerance did not play a significant role in attracting highly educated individuals to a specific location. Instead, the availability of jobs and desirable amenities were identified as the primary factors influencing their decision to settle in a particular area (Gerard & van Woerkens, 2014). According to Clifton (2013), there was a direct correlation between the quality of a city and its potential to recruit highly qualified individuals, which supports Florida's theory (Florida, 2002). However, deviations arose when creative class subgroups were examined.

2.9 Graduate Retention

The importance of graduate retention in a certain region cannot be overstated. According to Moretti, (2004), an increase of 1% in the population of college graduates can result in an increase in salaries for the rest of the community. Further investigation indicates that a rise in the number of graduates in a particular area has the capacity to boost the local Gross Domestic Product (GDP) of that area. According to a study, a region had a 2% boost in its Gross Domestic Product (GDP) for every 1% increase in the number of college graduates (Abel & Gabe, 2011).

Universities and colleges, with the exception of those based in London, generally create graduates who relocate to other regions for employment (Faggian & Mccann, 2009). Evidence from five Finnish regions indicate that university provinces, on average, only manage to keep 50% of their local population and 50% of their total graduates. The majority of graduates are drawn to career prospects in the capital city of Helsinki (Saarivirta & Consoli, 2007). Moreover, it has been observed that economically prosperous major cities have better rates of retaining their population (Venhorst et al., 2011). Nevertheless, they contend that graduates who have taken an extended period to finish their education are likewise more inclined to remain in the region.

Over time, researchers saw a gradual increase in the number of local graduates choosing to stay in a peripheral city of Aalborg in Denmark, while there was a slight decrease in the number of graduates from outside the region choosing to stay (Evers, 2019). Research

indicates that urban universities experience greater increases in the number of graduates who stay in the workforce in the urban region, but non-urban institutions have higher rates of graduates who pursue entrepreneurship (Kitagawa et al., 2022).

Additionally, there is evidence to support the study programme's ability to retain graduates in the area. Graduates with a background in ICT had a higher rate of retention compared to those with a background in biological sciences (Fernandez-Guerrero & Evers, 2018). However, certain peripheral regions in the Netherlands are successful in retaining highly skilled graduates (best) in specific fields of study (Venhorst et al., 2010). Wood et al., (2020) discovered that literacy in STEM has a positive impact on retention rates among underrepresented groups in various areas. Nonetheless, the programme of study exhibits a slightly more pronounced correlation with retention rates compared to the type of institution (O'Neill & Bagchi-Sen, 2022). According to O'Neill & Bagchi-Sen (2022), graduates who possess skills that are well-suited for non-tradable services, such as education and social services, are more likely to stay in the same state. On the other hand, graduates with skills in highly tradable sectors like computers and math, business, and engineering have a lower rate of retention. However, it is also observed that colleges and universities that receive students from beyond their local regions tend to have lower retention rates overall. Graduating from a specialised institution is linked to a greater retention rate of graduates (Rehák & Eriksson, 2020). Labour retention is correlated with a more comprehensive knowledge base in science, technology, engineering, and mathematics (STEM) in metropolitan regions. However specialising in non-STEM fields, whether in urban or non-urban settings, has a direct impact on the ability to retain entrepreneurship within the region thereby employing other graduates which leads to further retention of skilled labour (Kitagawa et al., 2022).

The presence of local enterprise/entrepreneurship helps to decrease the migration of highly educated individuals by promoting a feeling of belonging and connection to the community which outweighs monetary considerations (Stroope et al., 2014). Moreover, the active participation of college students and recent graduates in the community initiative enhances the rate of retention (Ndiangui, 2021). Similar to Stroope and colleagues, Artz, and Yu find that Iowa State University alumni who live in rural areas after graduating, place more importance on nonpecuniary goals and values, such as

family tradition, earning respect from friends, and establishing a business for their children to inherit, rather than monetary gains (Artz & Yu, 2011; Stroope et al., 2014). Furthermore, additional evidence indicates that recent graduates are more likely to stay in the region if they establish social relationships, such as friendships (Winters, 2011).

Furthermore, non-economic factors (leadership opportunities) have a significant impact on retention decisions (Ehrke et al., 2022).Furthermore, it was apparent that non-economic factors have the tendency to retain graduates, particularly those who have accumulated capital (Imeraj et al., 2018).

However, in order to attract and retain creative individuals, it is crucial to identify a location that possesses comprehensive hard infrastructure, complemented by a superior infrastructure consisting of diverse cultural amenities, a multicultural society, tolerance, and an inspiring environment (Vitálišová et al., 2020).

The non-research oriented higher education institutions exhibit a more evident ability to retain local skills (Lawton Smith & Waters, 2019). However, Alumni from community and mixed bachelor's colleges tend to stay in New York state for longer periods of time compared to graduates from master's and a doctoral degree granting colleges and universities (O'Neill & Bagchi-Sen 2022). In addition, they discovered that approximately 64% of associate's degree programmes have retention rates exceeding 66.7%, however none of the programmes at the doctoral/professional degree level had retention rates equal to or more than 66.7%. According to their findings, improving the quality of universities in smaller regions can potentially result in unwanted brain drain, at least in the near term, if this increase in supply is not aligned with the local need (Rehák & Eriksson, 2020). According to the data, there is a definite correlation between the quality of university research and teaching in a student's region of origin and their likelihood of choosing to study in a different macro-area. Higher quality education in their region of origin reduces the probability of migration for studying purposes (Ciriaci, 2014).

The lack of a strong connection between the town and the university negatively impacts the ability of communities to benefit from the presence of university graduates (Massey et al., 2014). However, they also propose that these initiatives may involve promoting the

establishment of new businesses in the area, with the aim of enhancing student internships and job prospects for graduates. Additionally, they aim to create an ecosystem that fosters entrepreneurial activity relevant to various industries (Massey et al., 2014). Similar to Massey and colleagues, Hansen asserts that career guidance and internships enhance the likelihood of graduates staying in the same geographical region (Hansen et al., 2003; Massey et al., 2014). According to Winters, (2011), recent graduates who have contacts with employers have high rates of retention. Furthermore, in northern Ontario region for graduates to be retained plans should be enhanced for employment plans and foster entrepreneurship. However, it is important to note that job prospects alone do not ensure that graduates will decide to stay in the area (Robichaud, 2014). According to Krabel & Flöther, (2014), graduates who have undertaken business internships are more likely to secure employment and less likely to relocate for work. Furthermore, they observed that graduates who are self-employed are more inclined to remain in the same geographical area as their institution. This tendency might be attributed to their heavy reliance on social connections during the initiation of their entrepreneurial ventures (Krabel & Flöther, 2014). Furthermore, it has been observed that graduates who secure employment after completing their studies are less inclined to relocate if they reside in a metropolitan area and if the proportion of highly skilled workers in the region is quite high (Krabel & Flöther, 2014). Artz & Yu (2011) discovered that entrepreneurship was the second most significant factor in retaining University of Iowa graduates. However, other research indicates that economic factors such as the cost of living and a robust local economy have a significant impact on the high rate of recent graduates choosing to stay in Iowa (Fiore et al., 2015). In California, aligning job opportunities with graduates' skill sets and offering competitive compensation that adequately offset the high cost of living will likely result in a higher retention rate of graduates (Stephens, 2019).

According to Stephens (2019), it is recommended to establish channels for graduates to engage with both the institution and the city in order to increase the likelihood of them staying in the area. To further support this alumni networks have the potential to facilitate relationships for graduates in the city where the university is situated (David & Coenen, 2014).

Graduates in Pittsburgh are more likely to remain in the region if they are provided with competitive earnings. The likelihood of staying also increases when their wives are offered career prospects in the same region (Hansen et al., 2003). Furthermore, the primary factor that significantly influences students' intentions to remain in Appalachia is a greater anticipated probability of securing an engaging work that offers desirable features such as a competitive income and prospects for career progression (Vazzana & Rudi-Polloshka, 2019).

In the literature on graduate retention, the majority of studies concentrate on a particular institution or a specific region associated with a university. However, there are also studies that examine a group of university regions. Others mostly employ a qualitative technique to generate their conclusions. Only a limited number of studies have utilised publicly available data collected by public agencies. However, these studies are predominantly carried out in Nordic countries such as Finland, Sweden and Denmark. Several studies have also specifically examined rural areas, primarily in the United States. Previous studies utilised publically accessible data to monitor students' progress 18 months after their completion of studies, however the present study surpasses these studies in scope and depth. Others centred around a specific state or a group of labour markets.

In the Canadian context, a notable study that closely examined the PSIS data mostly focused on the provincial level (Narh and Buzzelli, 2022).However, others have primarily utilised the national graduate survey, although they have predominantly combined the aspects of attracting and retaining graduates (Newbold, 2017). Massey et al. (2014) employed a mixed method approach, including focus group discussion and web surveys. In addition, they chose a particular university region, Queen's University, to conduct their poll, so narrowing down the scope to a specific context.

Considering the complex nature of these studies, it would be appropriate to situate them within the larger context of Canada. Given the vast expanse of Canada and the significant distances separating urban regions, known as Census Metropolitan Areas (CMAs). It was crucial to determine how the movement and persistence of graduates vary in different locations, covering both large and medium-sized cities.

2.10 Municipal Retention Strategies on Talent

Table 2.1: Summary of retention strategies of selected Canadian cities

City **Region**	**Policy Documents**	**Strategies**
Toronto	✓ Talent Blueprint 2014-2018	✓ Increase capacity of the city to retain talents in a competitive market by engaging talents from diverse backgrounds
Montreal	✓ 2024-2026 Strategic Plan	✓ Strengthen collaborations between businesses and education institutions ✓ Prioritise building network connecting businesses to available talent ✓ Prioritise support projects focused on talent development to support business performance.
Ottawa	✓ Strategic Plan 2023-2026	✓ Create a liveable to retain immigrants, talents and students ✓ Make housing affordable ✓ Create reliable and safe mobility options
Vancouver	✓ 2019 Economic Development in Vancouver ✓ 2011 Vancouver Economic Commission	✓ Review housing policy to make it affordable and improve housing options. ✓ Increase day care spaces ✓ Set up platforms for local businesses to recruit talents ✓ Strengthen skills and talent production with key growth sectors. ✓ Improve support local businesses in their efforts to attract and retain talents
Calgary	✓ Action Plan for our economy: 2024 Annual Progress Report ✓ 2022 Calgary Economic Development	✓ Create centralized portal and provide one-to-one support ✓ Streamline the postsecondary student recruitment process for employers to access talents. ✓ Organise career fairs to show case employers to postsecondary students. ✓ Improve housing options.
Edmonton	✓ Corporate Workforce Plan 2015-2020	✓ Promote competitive compensation practices ✓ Encourage targeted employment supports and programs ✓ Encourage an inclusive and respectful workplace ✓ Develop recommendations for enhanced corporate-wide recognition program to

		support attraction and retention of diverse workforce
Winnipeg	✓ Economic Development2019 Quarterly Progress Report ✓ Economic Development Winnipeg 2023 Annual Report	✓ Support business in their efforts to attract and retain talents ✓ Collaborate with strategic partners like postsecondary institutions ✓ Establish talent hub to help businesses keep talents ✓ Create job portal for easier connection between employers and employees
Saskatoon	✓ SREDA 2020 Growing Together ✓ 2023 Annual Report ✓ Strategic Plan 2022-2025	✓ Increase retention by eliminating systemic racism and promote diversity ✓ Collaborate both locally and internationally to attract and retain talents ✓ Strengthen collaboration between businesses, entrepreneurs and postsecondary institutions to create new opportunities
London	✓ Strategic Plan 2023-2027 ✓ London's Community Economic Road Map 2015-2020	✓ Provide affordable housing ✓ Provide internships ✓ Develop curriculum of to meet post graduation needs ✓ Collaborate strategic partnerships with business interest and employment opportunities ✓ Collaborate with HEIs to support retention of graduates post-graduation
KWC	✓ 2014 Waterloo Region Economic Development Strategic	✓ Attract more research institutions and expand existing centres. ✓ Create events to attract potential businesses and talents ✓ Strengthen entrepreneurship programs at postsecondary institution for tech entrepreneurs ✓ Identify and bring in high technology industries ✓ Connect labour force with education programs ✓ Review housing policies to make it affordable
Guelph	✓ Foreign Direct Investment Attraction and Retention Strategy and Action Plan ✓ Strategic Plan 2019-2023	✓ Establish outreach programs to foreign students particularly in STEM disciplines ✓ Leverage partnerships with businesses to attract the talent the city requires such as trades and technology
Hamilton	✓ Hamilton Workforce Strategy 2023 ✓ 2023 Workforce Hamilton Planning	✓ Retain vital occupations such as Early Childhood Educators ✓ Strengthen inclusive and diverse communities ✓ Work with postsecondary partners for talent retention

		✓ Catalyse partnerships for stronger talent attraction and retention. ✓ Promote diversity, inclusion and equity. ✓ Pilot a post-graduate retention program to retain international student graduates
St Catharines	✓ Strategic Plan 2019-2028 ✓ Economic Development and Tourism Strategy 2024-2029	✓ Engage with postsecondary institutions to maximize international student retention ✓ Participate with education institutions to engage and educate youth on skilled trades careers ✓ Promote and support the expansion of targeted talent development initiatives ✓ Support workforce leaders in development of a talent attraction and retention initiative. ✓ Focus on investment, employment and partnerships to attract and retain talents

Source: Author's Construct, 2024

Chapter 3
Methodology

3.1 Introduction

The aim of the study is to investigate the retention among postsecondary graduates (undergraduates and graduates) in some select Census Metropolitan Areas (CMAs) across Canada. The study looks at answering the research question: What spatial patterns emerge in the post-graduation trajectories of postsecondary graduates and how do these patterns shape regional development dynamics?

In this study, I would want to clarify a few key words that will be used in subsequent discussions. Graduates, in the context of this study, refer to students who have successfully completed their programmes at postsecondary institutions (universities and colleges) and have been awarded degrees, diplomas, or certificates. The cohorts used for graduation are from the years 2013, 2014, and 2015. The rationale for this is that those are the periods during which PSIS data attains a higher level of reliability. Once again, three cohorts were utilised due to the insufficiency of employing only a single year to meet the requirements set by Statistics Canada. According to this study, retention refers to the graduates who chose to remain in the region of study, namely CMAs, after completing their education. The PSIS data, in conjunction with the T1FF dataset, was utilised to track the movement of graduates. Specifically, the years 2016 and 2019 were extracted from the T1FF dataset, which contains information about individuals' tax filings. Using this methodology, it would be possible to monitor the progress of these graduates over a period of one year and four years.

The purpose of this chapter is to provide a detailed explanation of the methodology employed in the research, including the datasets and the data cleaning procedures used from the Statistics Canada.

3.2 Overview Education and Labour Market Linkage Platform(ELMLP)

The ELMLP is a comprehensive longitudinal data platform that encompasses anonymized administrative records on students enrolled in postsecondary education (PSE) and apprenticeship programmes, along with their personal income tax information (Statistics Canada 2021a). The platform revolves around three administrative datasets:

The Registered Apprenticeship Information System (RAIS), Postsecondary Information System (PSIS), and T1 Family File (T1FF) tax records.

Statistics Canada, in partnership with territorial and provincial ministries of education and Employment and Social Development Canada (ESDC), gathers the ELMLP data. The ELMLP addresses knowledge gaps and enhances comprehension of student apprenticeship pathways, the transfer to the labour market, and long-term outcomes. The platform offers an extensive range of student attributes for both postsecondary education and apprenticeship, as well as their respective career paths. Furthermore, it offers a means for academics to establish a connection between the three administrative core datasets.

PSIS dataset exclusively gathers data from educational institutions, both public and private (non-profit), that receive funding from the Ministry of Education. Graduates from privately funded universities or public colleges that do not receive provincial funding are not considered in this study (Choi et al.,2023). PSIS utilises programme counts rather than student counts for enrolments. If a student is registered in multiple programmes as of the snapshot date, then all of their programmes are included in the count. Students enrolling in apprenticeship programmes are not included in the count. Nevertheless, the PSIS data does not include details regarding the students' income or the location where they submitted their tax returns (Van Bussel & Fecteau 2022).In the PSIS dataset, there is no sampling done.

The T1 family files (T1FF) are an administrative dataset(also part of ELMLP) obtained from income tax returns filed with the Canada Revenue Agency. They contain income and financial information on residents in Canada. The data is accessible for Canada, its provinces and territories, as well as sub-provincial geographic regions. Deceased tax filers within the current year are excluded and hence not included in this study (Statistics Canada 2021).

3.3 Variables of Interest

The study utilised specific variables from both the PSIS and T1FF datasets to accomplish its objectives. GRADYEAR, as specified by the PSIS codebook, refers to the year in which a student acquired a degree, certificate, or diploma upon completing their

programme. This variable serves to determine the years in which the student completes their education and meets the criteria for being classified as a graduate.

The IPOSTAL, or institutional postal code, is a six-digit alphanumeric code that aids in determining the physical location of a postsecondary institution. It is beneficial to be aware of the particular CMA in which the institution is situated, as it indicates the geographical origins of the graduate.

Register Group ID, it is a distinct identifier that can be utilised to connect PSIS data with other administrative and survey data within an ELMLP. Within this particular context, this variable serves the purpose of establishing a connection between T1FF, which is one of the datasets included in ELMLP.

In T1FF, I utilised the Refyear variable to denote the specific year in which students filed their taxes. This variable facilitated the tracking of graduate mobility via one and four year follow-up assessments.

A CMA16 refers to a Census Metropolitan Area or Census Agglomeration. This variable stores a numeric code consisting of three digits. This variable helps to identify individual level movements. Nevertheless, it encompasses both CMAs and CAs codes. According to this study, the term "region" is defined as CMA. Therefore, I specifically concentrated on CMAs in the year 2016 and 2019.This will display the destination region of graduates who have chosen to relocate from where they studied. In the study, large CMAs are characterised as those with a population of one million or more. Midsized CMAs refer to those with a population of 300,000 or more. However, CMAs with populations under 300,000 are classified as small-sized(Tassonyi, 2017).

In the T1FF dataset, it is seen that several graduates list their family homes as their residences for tax purposes, despite having relocated. Additionally, some utilise institutional addresses, for instance, when submitting through their accountants. These accountants utilise the addresses of their offices instead of the precise locations of their clients.

RECORDID was selected as a variable of interest because to the fact that in the PSIS dataset, enrollments are determined by programme counts rather than student numbers. In

the PSIS dataset, students enrolled in numerous programmes of study are recorded many times; thus, the variable aids in the elimination of duplicates. (Statistics Canada 2015).

To address the research question, I utilised the latest PSIS dataset available, specifically the dataset for the reporting year 2020. PSIS was then merged with T1FF, resulting in the expulsion of all graduates or students who failed to submit their tax returns for the given years 2016 and 2019. Using the specified data, I selected individuals who graduated in the years 2013, 2014, and 2015 and who also submitted their taxes in both 2016 and 2019. Importantly, PSIS does not give information on the CMAs where the postsecondary institutions are situated. Therefore, PCCF codes were employed to transform the postal codes of the institutions into CMA codes, facilitating a straightforward comparison with T1FF.The Postal Code Conversion File (PCCF) successfully converted approximately 25% of the total postal codes. The remaining postal codes were manually completed by referring to Canada Post documentation.

All graduates who did not have a value entered in the graduation year column were excluded. Graduates whose institution postal code was absent were also excluded. An average of around 35% of graduates from the years 2013, 2014, and 2015 completed their tax filings from the years 2014 to 2019. It is important to mention that the Saint John CMA in New Brunswick is the only CMA in the list that did not document any institution or college in the region, as per the particular variables examined in this study. Furthermore, it verifies that PSIS does not include the comprehensive register of all public postsecondary institutions.

Table 3. 1: Number of enrollments, graduates of cohorts of 2013, 2014 and 2015 of universities and colleges

	2013	2014	2015
Total number of students enrolled in Higher Education (HE) (PSIS only)(using the start year of program)	1,086,460	1,053,140	926,930

Total number of graduates in Higher Education (HE) [PSIS only]	492,850	507,340	521,800
Total graduates after merging T1FF(immediately)	148,120	172,030	211,530
Total graduates who filed taxes in 2016 (have Higher Education Institutions (HEI) postalcodes)	68,360	65,600	67,060
Total graduates who filed taxes in 2019(have Higher Education Institution (HEI) postalcodes)	68,810	65,290	66,150

Source: (PSIS and T1FF,2020)

According to the 2020 PSIS reporting cycle, the number of postsecondary students (undergraduates and graduates) enrolled at all levels showed small declines compared to the benchmark year of 2013.The total enrollment in 2013 was 1,086,460, but it decreased to 1,053,140 in 2014 and 926,930 in 2015. However, there was a modest increase in the number of graduating students. It is evident that graduates (undergraduates and graduates) from all three cohorts show a reluctance to file their taxes, however the numbers (148,120 to 211,530) seem to increase with each subsequent cohort for cohorts from 2013 to 2015.The total number of graduates in 2013 who submitted their tax returns in 2016 and attended postsecondary institutions located in a Census Metropolitan Area (CMA) was 68360. The number decreased to 65,600 for the graduating class of 2014 and slightly increased to 67,060 for the graduating class of 2015.

3.4 Composition of Domestic and International Graduates

The composition of all three cohorts of graduates that filed their taxes in 2016 consisted of a significant number of domestic graduates (Canadian and permanent residents) with a total of 170,280. Additionally, there were approximately 22,170 international graduates who graduated that same year. In 2019, the number of domestic students/graduates increased to 172,200, while the number of international learners who graduated decreased to 19,850.

Table 3. 2 :Number of Domestic and International students in the graduating cohorts 2013,2014 and 2015

	2016	2019
Domestic graduates of cohort (2013,14 and 15) that filed their taxes and had their HEI in a CMA	170,280	172,200
International graduates of cohort (2013,14 and 15) that filed taxes and had their HEI in a CMA	22,170	19,850

Source: (PSIS and T1FF, 2020)

This study examines all postsecondary institutions with varying features among the select CMAs. Several colleges are also institutions that confer degrees. Indeed, some regions possess fewer institutions, but cities regions like Toronto and Montreal have more institutions; hence, the likelihood of these places attracting and retaining a greater number of graduates is expected to be higher than in regions with fewer institutions.

Table 3. 3: List of universities and colleges in each Census Metropolitan across Canada

Census Metropolitan Area	Universities	Colleges
Toronto	University of Toronto, York University, Ryerson University, University of Toronto-Mississauga, Seneca College of Applied Arts and Technology, University of Guelph-Humber Campus, University of Toronto-Scarborough, OCAD University, Mcmaster at Burlington, University of Ottawa-Toronto Campus, Toronto School of Theology	George Brown College of Applied Arts and Technology, Sheridan College Institute of Technology, Centennial College of Applied of Arts and Technology, Humber College of Applied Arts and Technology North Campus, Sault College of Applied Arts and Technology
Montreal	Ecole Polytechnique, Universite de Montreal, Concordia University, Universite du Quebec a Montreal, Ecole des hautes etudes commerciales, Ecole de technologie superieure	CEGEP John Abbott College, McGill University,CEGEP d'Ahuntsic, College LaSalle, CEGEP Gerald-Godin, College Dawson, College Vanier, College Andre-Grasset, Champlain Regional College-St Lambert Campus, CEGEP de Maisonneuve, Marianopolis College, CEGEP Lionel-Groulx, CEGEp du Vieux Montreal, CEGEp Marie-Victorin, CEGEP de Bois- de-Boulogne, CEGEP de Saint –Jerome,CEGEP de Rosemont,CEGEP de Saint-Laurent, CEGEP Montmorency, CEGEP Edouard-Montpetit, CEGEP

		regional de Lanaudiere a Terrebonne, CEGEP regional de Lanaudiere a Joliette, CEGEP regional de Lanaudiere a L'Assomption, CEGEP Andre-Laurendeau, MacDonald College-Universite McGill,Institut de tourisme et d'hotellerie du Quebec,College Jean-de-Brebeuf, College O'Sullivan de Montreal Inc, College TAV, College international des Marcellines, Ecole de stenographie judiciaire du Quebec, CEGEP Saint-Jean-sur-Richelieu, Conservatoire Lassalle, College Centennal, Ecole de Musique Vincent d'Indy, Institut Teccart Inc, Collegial

		international Sainte-Anne, College Lafleche
Vancouver	University of British Columbia, Vancouver Island University, Simon Fraser University, Capilano University, Emily Carr University of Art and Design, Kwantlen Polytechnic University	British Columbia Institute of Technology, Douglas College, Vancouver Community College, Justice Institute of British Columbia, Langara College,
Ottawa	University of Ottawa, Carleton University, Universite du Quebec en Outaouais, University Saint-Paul	Alonquin College of Applied Arts and Technology, La Cite collegiale d'arts appliques et de technologie-Campus d'Ottawa, CEGEP de l'Outaouais, College Heritage/Heritage College,

		College Nouvelles Frontieres
Calgary	University of Calgary, Mount Royal University, Ambrose University, St Mary's University	Northern Alberta Insitute of Technology, Southern Alberta Institute of Technology, Bow Valley College, Alberta College of Art and Design
London	Western University, King's University College, Huron University College, Brescia University College	Fanshawe College of Applied Arts and Technology
Quebec	Ecole nationale d'administration publique, Universite Laval, Tele-Universite, Institut national de la recherche scientifique, The King's University	CEGEP de Levis-Lauzon, CEGEP de Sainte-Foy, College O'Sullivan de Quebec inc, CEGEP Francois-Xavier Garneau, Campus Notre Dame-de-Foy, College Merici, College Bart, CEGEP Limoilou, Champlain

		Regional College-St Lawrence Campus
Edmonton	University of Alberta, Grant MacEwan University, Concordia University of Edmonton, Athabasca University, The King's University	NorQuest College, Northern Alberta Institute of Technology
Winnipeg	University of Manitoba, University of Winnipeg, Universite de Saint-Boniface, Canadian Mennonite University	L'Ecole Technique et Professionnelle,Red River College, Manitoba Institute of Trades and Technology
Halifax	Dalhousie University, Saint Mary's University, Mount Saint Vincent University,	Nova Scotia Community College(NSCC),

	University of King's College, Atlantic School of Theology, NSCAD University	
Kitchener Cambridge Waterloo	University of Waterloo, Wilfrid Laurier University, Wilfrid Laurier University-Kitchener Campus, Martin Luther University College, McMaster Nursing at Conestoga, St Jerome's University, University of Waterloo-Cambridge Campus, Conrad Grebel University College, University of Waterloo-Kitchener Campus	Conestoga College Institute of Technology & Advanced Learning

Hamilton	McMaster University, McMaster Nursing at Mohawk, McMaster Divinity College	Mohawk College of Applied Arts and Technology
St Catharines	Brock University, Brock College of Education	Niagara College Canada
Oshawa	Ontario Tech University, Trent University at Durham College	Durham College of Applied Arts & Technology
Barrie		Georgian College of Applied Arts and Technology
Peterborough	Trent University	Fleming College of Applied Arts and Technology
Kingston	Queen's University, Queen's University-Theological College	St Lawrence College of Applied Arts & Technology
Saskatoon	University of Saskatchewan	Saskatchewan Polytechnic,

		St. Thomas More College
Greater Sudbury	Laurentian University, Northern Ontario School of Medicine-East Campus	Cambrian College, College Boreal d'art appliques et de technologie
Regina	University of Regina	
Sherbrooke	Bishop's University, Universite de Sherbrooke	CEGEP de Sherbrooke,Champlain Regional College-Lexnnoville, Seminaire de Sherbrooke
Saguenay	Universite du Quebec a Chicoutimi	CEGEP de Jonquiere,CEGEP de Chicoutimi
Trois Riviere	Universite du Quebec a Trois-Rivieres	College Lafleche, College de Trois-Rivieres, College Ellis,campus de Trois-Rivieres
Kelowna	University of British Columbia, Okanagan	Okanagan College
Thunder Bay	Lakehead University, Northern Ontario School of Medicine-West Campus	Confederation College of Applied Arts and Technology
Victoria	University of Victoria, Royal Roads University	Camosun College
Abbotsford Mission	University of the Fraser Valley	
Moncton	Universite de Moncton	
Brantford	Wilfrid Laurier University-Brantford Campus	
St John's	Memorial University of Newfoundland	Fisheries and Marine Institute of Memorial University of Newfoundland
Windsor	University of Windsor, University of Ottawa-Windsor campus	St Clair College of Applied Arts and Technology

Source: (PSIS and T1FF,2020)

Chapter 4
Results

4.1 Introduction

This chapter presents a comprehensive analysis of the findings derived from the research data meticulously collected and analysed at the Research Data Centre (RDC). The study's primary objective is to explore the spatial patterns that emerge in the post-graduation trajectories of postsecondary graduates across Canada. By addressing the research question—What spatial patterns emerge in the post-graduation trajectories of postsecondary graduates and how do these patterns shape regional development dynamics?—this chapter offers insights into the migration and retention trends of graduates within the country. To achieve a robust analysis, the study constructs two assessment matrices. The first assessment occurs one year after the graduation of the last cohort in 2015, while the second assessment takes place four years post-graduation. This temporal framework allows for a nuanced examination of the evolving post-graduation paths and their subsequent impact on regional development. The analysis focuses on thirteen selected Census and Metropolitan Areas (CMAs) across Canada, each hosting at least one postsecondary institution. These CMAs were chosen based on their high graduate counts, ensuring a representative sample for the study. Despite certain CMAs failing to meet RDC's vetting criteria, necessitating their consolidation, the selected CMAs closely align with the study's intended focus areas. Detailed information on graduate migration and retention across these CMAs is available in the Appendix. The theoretical foundation of this study is supported by Richard Florida's (2002) concept of the creative class, which underscores the significant influence of human capital concentration on regional economic development. The presence of a knowledge-based economy and a highly skilled workforce correlates positively with higher regional wages (Berry & Glaeser, 2005; Florida, 2002; Florida et al., 2010). Consequently, cities aim to attract and retain skilled graduates to enhance their economic well-being, often through policies that foster local retention of educated individuals (Leibovitz, 2003). In this context, the chapter delves into the empirical findings, illustrating how postsecondary graduates' migration patterns contribute to regional development and offering valuable insights into policy implications for urban planning and economic strategies.

4.2 Construction Process of Matrices

To start with, I combined the PSIS and T1FF datasets by utilising the REGISTER_GROUP_ID. Subsequently, I filtered the data based on the GRADYEAR variable to include only students who graduated in the years 2013, 2014, and 2015. Additionally, I restricted the selection to include only those graduates who reported their tax information for both 2016 and 2019, using the REFYEAR data from the T1FF. The aim of the study is to monitor the post-graduation destinations of the graduates. Therefore, I selected the study institution's location (CMA) as the starting point and the place where they submitted their taxes for the particular year of interest as the destination. The PSIS dataset does not include CMAs for the research region. Given that only the postal code of the institution was available, I converted the postal code into CMA. Initially, I employed the PCCF for the conversion process. Nevertheless, it is important to acknowledge that PCCF was unable to do all of the conversions. Therefore, I had to convert the remaining data manually by referring to sources such as Canada Post and Statistics Canada (2016). I utilised Canada Post documentation to verify the Forward Sortation Area (FSA) in order to determine the specific Census Metropolitan Area (CMA) where the institution is situated. Additionally, I relied on Statistics Canada documentation to confirm whether the particular location or FSA in question is truly part of the CMA (Statistics Canada 2016). Once all postal codes were converted into CMA codes, I programmed the dataset to choose specific CMAs. From that subset, I utilised the CMA codes from the T1FF portion of the merger to decide the destination of each graduate. Therefore, this was employed to construct the matrices.

Per requirements of Statistics Canada[1] , cell counts that did not reach the minimal criteria had to be merged in order to satisfy the vetting requirements. For example, in 2019, a total of 40 graduates from Kitchner Cambridge Waterloo (KWC) and Guelph relocated to Montreal. It was evident that each cell failed to meet the conditions, hence resulting in the merger. In 2019, a total of 90 graduates from various cities, including Oshawa, Halifax, Barrie, Peterborough, Kingston, Greater Sudbury, Quebec, Windsor, Regina, Sherbrooke, Trois Riviere, Saguenay, Kelowna, Thunder Bay, Victoria, Abbotsford, Moncton, Brantford, and St John's, relocated to Saskatoon. This phenomenon is seen in

[1] Statistics Canada and Research Data Centre are used interchangeably

both years examined (refer to Appendix). Furthermore, the numbers were approximated to the nearest multiple of 10 prior to fulfil the final criteria.

Table 4. 1: Matrix of 2013-2015 Postsecondary Graduates who moved among various Census Metropolitan Areas in 2016

	Toronto	Montreal	Ottawa	Vancouver	Calgary	Edmonton	Winnipeg	Saskatoon	London	KWC	Guelph	Hamilton	St Catharines
Toronto	32740	230	460	520	480	540	140	50	270	470	270	1290	310
Montreal	520	21240	280	140	80	60	10	20	20	10	20	20	30
Ottawa	620	590	6630	80	70	90	20		30	40		80	
Vancouver	390	70	80	10600	290	180	70	50	20	10	20	30	30
Calgary	140	20	30	90	5980	280	30	50	10	20	10	20	
Edmonton	100		20	80	220	4610	30	40	20				
Winnipeg	100	20	30	60	60	50	4700	10		20		10	
Saskatoon	60	10	20	50	70	50	40	1450	10			10	
London	1620	40	100	110	120	80	40	30	2910	250	90	210	80
KWC	1540	30	100	70	70	40	30		100	2100	360	150	50
Guelph	360		30	20	10				30	60	160	70	20
Hamilton	840	20	40	60	30	40			60	130	70	2580	160
St.Catharines	950	50	40	130	130	160	40	20	70	80	30	370	1930

Source: Author's Construct based on Statistics Canada's Postsecondary Student Information Survey, 2024

Owing to vetting protocols and the merging of certain cells within the tables (Tables 4.1 and 4.2). I was unable to transform the figures into percentages for enhanced clarity for the readership.

The displayed table (Table 4.1) illustrates the migration patterns of postsecondary graduates among different Canadian regions, documenting the destinations of graduates who studied in specific cities moved to by 2016. This dataset covers three groups of individuals who completed their studies in the years 2013, 2014, and 2015. This analysis will examine the primary migratory trends, with a specific focus on important findings and patterns derived from the data.

4.3 Major Origin Cities

Toronto, being the most populous city and a prominent centre of education in Canada, experienced a substantial retention of graduates inside the city after completing their studies, with a total of 32,740 graduates choosing to stay. Additionally, a significant proportion of the city's graduates, up to 1,290 individuals, relocated to Hamilton. This pattern might be attributed to the close proximity and economic connections between the two locations. Additional noteworthy locations comprise Kitchener-Waterloo-Cambridge (KWC) with a total of 470 graduates, Vancouver with 520 graduates, and Montreal with 230 graduates.

Montreal recorded a remarkable retention volume with 21,240 graduates choosing to remain inside the city. The migration from Montreal to Toronto, with a total of 520 individuals, was the most substantial migration for all graduates that moved from Montreal to other cities. This was followed by Ottawa, with 280 individuals, and Vancouver, with 140 individuals. This indicates that graduates are drawn to other big urban centres, either because of employment prospects or language and cultural ties.

Out of its graduates, Ottawa managed to keep 6,630 individuals, although a considerable number migrated to Toronto (620) and Montreal (590). This pattern corresponds to the prominence of Toronto and Montreal as prominent economic hubs that provide a wide range of employment opportunities. The migration to Vancouver (80) and Calgary (70) was relatively moderate but significant.

Vancouver attracted and kept 10,600 graduates, showcasing its attractiveness as a place to live in. There was a significant influx of people moving to Toronto (390) and Montreal (70), with Calgary (290) and Edmonton (180) also attracting a large number of migrants. The appeal of Toronto and Montreal stems from their thick labour market.

4.4 Secondary or Midsized Cities

Calgary retained 5,980 of its graduates. Calgary graduates primarily migrated to Toronto (140) and Vancouver (90), with Edmonton (280) being another popular destination. This suggests a significant movement of people inside Alberta and towards other large urban centres.

Edmonton attracted 4,610 graduates, with a notable number relocating to Calgary (220) and Toronto (100). The high level of movement inside Alberta indicates strong connections within its labour market, with Toronto being a notable destination outside of the province.

Winnipeg retained 4,700 graduates, with minimal migration to other locations. Significant locations were Toronto (100) and Calgary (60), indicating a moderate movement mainly towards major economic centres.

Saskatoon kept 1,450 graduates, with minimal movement to other cities. The main destinations consisted of Calgary (70) and Toronto (60). This suggests that although Saskatoon manages to keep a considerable number of its graduates, those who do depart tend to go to larger metropolitan areas.

London had a total of 2,910 graduates who chose to stay there. Notably, a substantial proportion of these graduates relocated to Toronto, namely 1,620 individuals. The migration trend serves as evidence of the robust connection between these two cities in Ontario. Other destinations included Kitchener Waterloo Cambridge (KWC), which had 250, and Hamilton, which had 210.

The Kitchener-Waterloo-Cambridge (KWC) region saw a net retention of 2,100 graduates, with a notable migration of 1,540 graduates to Toronto. The migration pattern highlights the strong economic and academic connections between KWC and Toronto.

Out of the 160 graduates from Guelph who stayed, most of them (360) moved to Toronto. Toronto's tremendous influx of people is a testament to its status as a prominent hub for both economic and cultural activities.

Hamilton had a total of 2,580 graduates, with a notable number of them moving to Toronto (840) and St. Catharines (160). This indicates a significant level of movement across different regions within the province of Ontario.

St. Catharines reported a total of 1,930 graduates, with the highest number moving to Toronto (950) and Hamilton (370). This suggests a regional movement trend between the Greater Toronto and Hamilton Area (GTHA) and St Catharines region.

The data reveals significant trends in the geographic distribution of Canadian postsecondary graduates. Metropolitan areas such as Toronto, Montreal, and Vancouver serve as prominent centres for retaining and attracting graduates from other cities. Significant intra-provincial mobility is observed, particularly in Alberta, with a substantial movement between the cities of Calgary and Edmonton. Ontario cities exhibit robust interconnection, particularly with Toronto serving as a core centre. These patterns are indicative of the wider economic, cultural, and geographic variables that impact the movement of graduates in Canada.

Table 4. 2: Matrix of 2013-2015 Postsecondary Graduates who moved among various Census Metropolitan Areas in 2019

	Toronto	Montreal	Ottawa	Vancouver	Calgary	Edmonton	Winnipeg	Saskatoon	London	KWC	Guelph	Hamilton	St Catharines
Toronto	31330	290	540	590	490	510	110	40	330	600	310	1440	340
Montreal	530	24120	370	160	80	50	20	20	10	20	20	30	40
Ottawa	580	640	6340	110	80	80	20		30	30		80	
Vancouver	470	80	70	9400	300	190	80	50	30	20	10	40	40
Calgary	170	20	40	140	5650	320	30	40	10	20	20	30	
Edmonton	130	20	30	100	240	4300	30	50	20				
Winnipeg	170	30	50	110	100	50	4330	10		20		20	
Saskatoon	90	20	30	50	110	70	40	1390	10				
London	1600	50	140	110	120	80	30	20	2720	270	80	240	70
KWC	1370	40	120	80	70	50	40		110	1900	340	170	50
Guelph	300		30	20	10				30	50	120	60	10
Hamilton	770	20	50	40	40	40			70	160	60	2360	170
St.Catharines	890	40	60	110	150	150	30	20	90	100	30	350	1780

Source: Author's Construct based on Statistics Canada's Postsecondary Student Information Survey, 2024

The table presents the migration behaviours of postsecondary graduates from different Canadian cities, providing information on the destinations of graduates who studied in certain cities moved to by 2019. This analysis will examine the predominant patterns and trends that arise from the data, with a specific emphasis on key observations.

4.5 Major Origin Cities

Toronto, being a prominent centre for education and commerce, managed to retain a substantial number of its graduates, with 31,330 choosing to remain in the city. Significant migrations included 1,440 individuals leaving to Hamilton, 600 graduates departing to Kitchener-Waterloo-Cambridge (KWC), 590 people moving Vancouver, and 290 individuals leaving to Montreal. This pattern demonstrates Toronto's powerful influence, while also emphasising major migration into other important urban areas in Ontario and beyond.

Montreal reported 24,120 graduates staying, indicating a high level of local retention. Nevertheless, there was significant migration to Toronto (530), Ottawa (370), and Vancouver (160). This indicates that Montreal is a prominent centre for education, with a notable number of people leaving to pursue career goals and establish linguistic bonds.

In 2019, Ottawa retained 6,340 individuals who have successfully completed their studies. The largest migration occurred to Toronto (580) and to Montreal (640), with Vancouver (110) also serving as a noteworthy destination. This pattern highlights Ottawa's position as a pivotal centre in the national capital region, with significant movement towards other major cities.

Also in 2019, Vancouver attracted and retained 9,400 graduates, confirming its status as a prominent city of choice. Notable migration occurred to Toronto (470) and to Calgary (300). This pattern demonstrates Vancouver's robust ability to retain talent, while simultaneously emphasising the attractiveness of other prominent economic hubs.

4.6 Secondary/ Midsized Cities

Calgary retained 5,650 graduates, with significant movement to Vancouver (140), Toronto (170), and Edmonton (240). This indicates a strong sense of regional connection within Alberta and a notable trend towards migration to larger urban areas.

Edmonton kept 4,300 individuals who had completed their studies. The predominant locations for its graduates were Calgary (240) and Toronto (130), suggesting significant inter-provincial mobility and noteworthy migration towards Toronto.

Out of the total number of graduates, Winnipeg managed to keep 4,330 individuals. However, a considerable number of graduates migrated to other cities, with Toronto attracting 170 graduates and Vancouver attracting 110 graduates both outside the province of Manitoba. This implies restricted mobility but significant relocation to big metropolitan areas.

Saskatoon kept 1,390 graduates, with only a number leaving for Calgary (110) and Toronto (90). This suggests a moderate trend of migration, with the majority of graduates either remaining in the same region or relocating to other urban areas.

London had a net retention of 2,720 graduates, with a significant number relocating to Toronto (1,600) and KWC (270). This emphasises a robust correlation within Ontario, particularly towards significant economic centres.

The Kitchener-Waterloo-Cambridge (KWC) region kept 1,900 individuals who had completed their studies. The largest migration was directed towards Toronto, with a total of 1,370 individuals leaving. This trend can be attributed to the robust economic and academic connections between these areas.

Out of the graduates from Guelph, 120 chose to stay in the city. The majority of those who left went to Toronto, with a total of 300 graduates. This suggests that a considerable proportion of graduates relocate to metropolitan areas in search of employment prospects.

Hamilton kept 2,360 individuals who had successfully completed their studies. Notable destinations were observed in Toronto (770) and St. Catharines (170), indicating the movement of people within the Ontario province.

Out of the 1,780 graduates from St. Catharines who stayed, 890 moved to Toronto and 350 moved to Hamilton. This indicates the movement patterns of people within the Greater Toronto and Hamilton Area (GTHA). 20 graduates moved to Saskatoon.

4.7 Similarities and Difference in 2016 and 2019 tax year

Overall, the matrices from 2016 and 2019 exhibit a high degree of similarity. The majority of graduates in both 2016 and 2019 were retained in the individual CMAs where they resided. Generally, a smaller number of graduates relocated to different locations in both matrices. There was a marginal rise of approximately 700 additional graduates who filed their tax returns in 2019, in terms of nominal figures. The increased figures had an insignificant impact on the 2019 matrix compared to the 2016 matrix. Furthermore, the distance decay factor for matrices exhibited comparable patterns.

In both 2016 and 2019, large cities such as Toronto, Montreal, and Vancouver continue to be highly sought-after destinations for graduates. Once again, mid-sized towns like as Edmonton, Calgary, and Ottawa exhibit comparable rates of graduates relocating and remaining, which suggests a somewhat stable socio-economic climate for young professionals (creative class).In the province of Alberta, Edmonton and Calgary exhibited strong internal mobility. During both years, cities generally witnessed a decrease in the retention of graduates. However, the cities of Winnipeg and Saskatoon are notable for receiving fewer graduates from other cities. Again, graduates from Winnipeg and Saskatoon often moved to large metropolitan areas such as Toronto and Vancouver. Cities such Montreal, Vancouver, Winnipeg, Calgary and Saskatoon reported more numbers moving to Toronto in 2019 as compared to 2016.

The matrices illustrate the discrepancies between major urban centres and midsized municipalities. Midsized cities had lower levels of incoming and retained talents in comparison to larger cities.

4.8 Most Graduates stay where they studied

The examination of spatial interaction between two locations, namely the origin and destination, has been the subject of extensive research for a significant duration. Based on the matrices presented in Tables 4.1 and 4.2, it is evident that the majority of graduates remained in the same location where they pursued their studies in both 2016 and 2019. In terms of nominal figures, most CMAs kept a higher number of graduates compared to those that departed. In 2016, more than half of the graduates remained in ten out of the thirteen CMAs. In 2016, the retention rates for graduates at KWC, Guelph, and St. Catharines were less than 50%. In 2016, Montreal, Winnipeg, and Edmonton achieved a

retention rate of above 90%. Montreal had the highest percentage, reaching 94.6%, among all CMAs.

In 2019, a comparable pattern can be identified as four out of the thirteen CMAs managed to retain less than 50% of its graduates. London, KWC, Guelph, and St. Catharines experienced a decrease of less than 50% in the number of their graduates. With the exception of Montreal, which experienced a marginal 1% increase, the rate of graduates remained consistent during the time. Every other CMA region had a decrease in the number of graduates overall. In 2019, there was a little increase in numbers (nominal terms).

4.9 Destination of Graduates (including those who stayed at the location where their postsecondary institutions are located)

In general, there has been a slight increase in the number of graduates in 2019 when compared the number of graduates in 2016. It is noteworthy that the three largest CMAs (Toronto, Montreal, and Vancouver) had the highest number of graduates in both years. In 2016, out of the 13 CMAs being considered, almost 61.4% of all graduates resided in the three largest CMAs. The remaining ones were distributed among the midsized cities around Canada. Nevertheless, in 2019, the percentage increased to 62.2% of graduates residing in the three largest CMAs.

In 2019, the number of graduates in Montreal increased by 13.5% compared to the number of graduates in 2016. It is important to mention that Montreal was the only city among the 12 CMAs that experienced an upsurge throughout this period. Ottawa experienced a slight rise of 0.13%. The number of graduates decreased for all other CMAs.

Vancouver, Guelph, and KWC experienced the most significant declines between 2016 and 2019. The percentages recorded were 9%, 13.9%, and 6.46% respectively. Toronto, London, and Calgary had the lowest attrition rates for graduates within the specified time period. The first value decreased by 2.25%, the second value was 2.64%, and the third value decreased by 2.84%.

4. 10 Destination of Graduates (excluding those who stayed at the location where their postsecondary institutions are located)

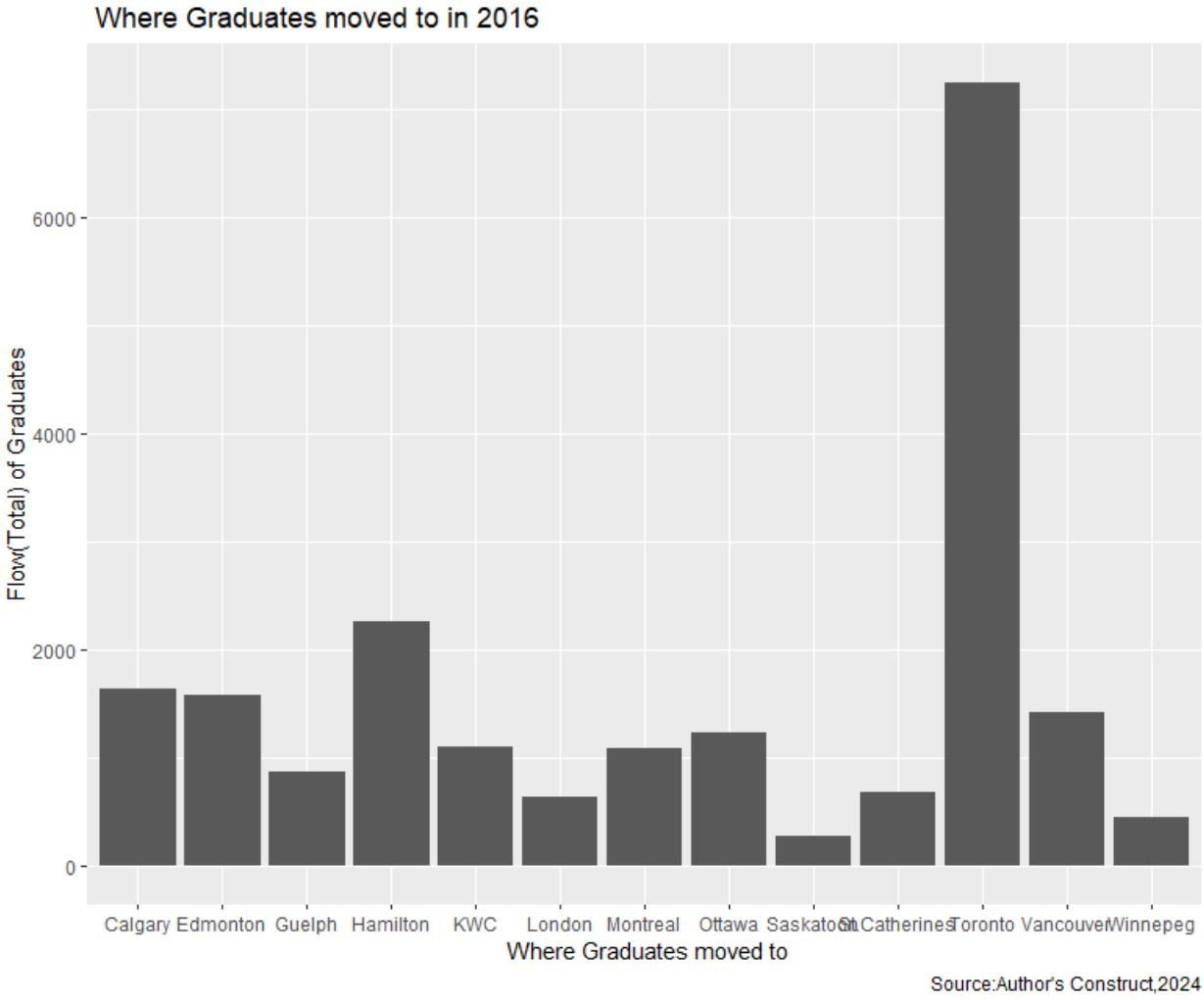
With the exception of KWC, Guelph, Hamilton and St. Catharines, all other CMAs observed a positive growth in the number of graduates who moved out in 2019.

The three most popular destinations for CMAs graduates were Toronto, Hamilton, and Calgary. In 2016, a majority of 51.5% of all graduates relocated to the three Census Metropolitan Areas (CMAs) specified. Nevertheless, in the year 2019, there was a slight surge, reaching a percentage of 52.38%.

Excluding graduates who remained in the area after finishing their study, it is evident that 47.65% of all graduates who relocated within the CMAs being discussed migrated to either Vancouver, Toronto, or Montreal in 2016. In 2019, the percentage decreased to 46%.

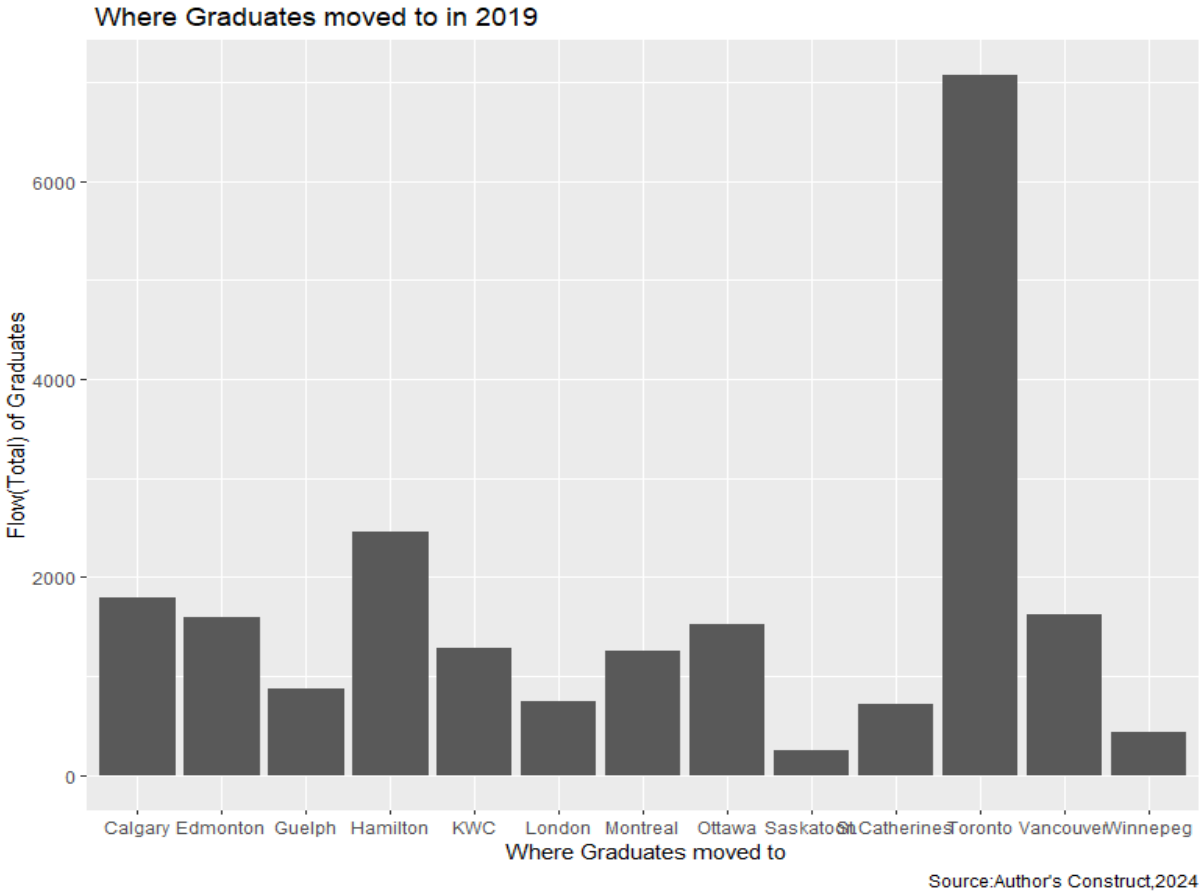
Edmonton, Winnipeg and Saskatoon had the highest rate of graduates moving out over the specified period (tax years 2016 and 2019). The percentages they received were 21.57%, 55.56%, and 31.25% respectively. Winnipeg had the highest percentage of graduates moving out among the cities in the Prairies region, with a rate of 55.56%. Nevertheless, Saskatoon and Winnipeg experienced the highest outflow of graduates among the Prairie cities and across all 13 Census Metropolitan Areas (CMAs).

Figure 4. 1: Where Postsecondary Graduates moved to in 2016(excluding those who stayed in the location of their HEI)



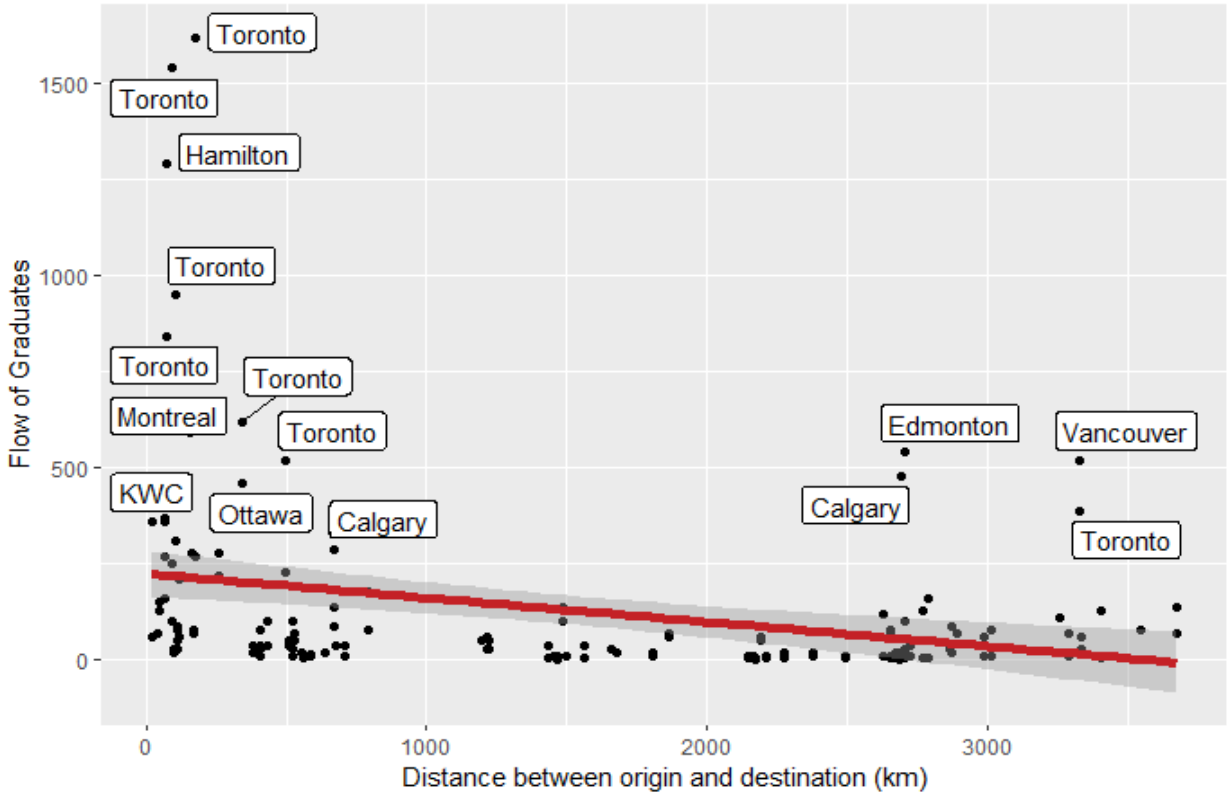
Source:Author's Construct,2024

Figure 4. 2: Where Postsecondary Graduates moved to in 2019(excluding those who stayed in the location of their HEI)



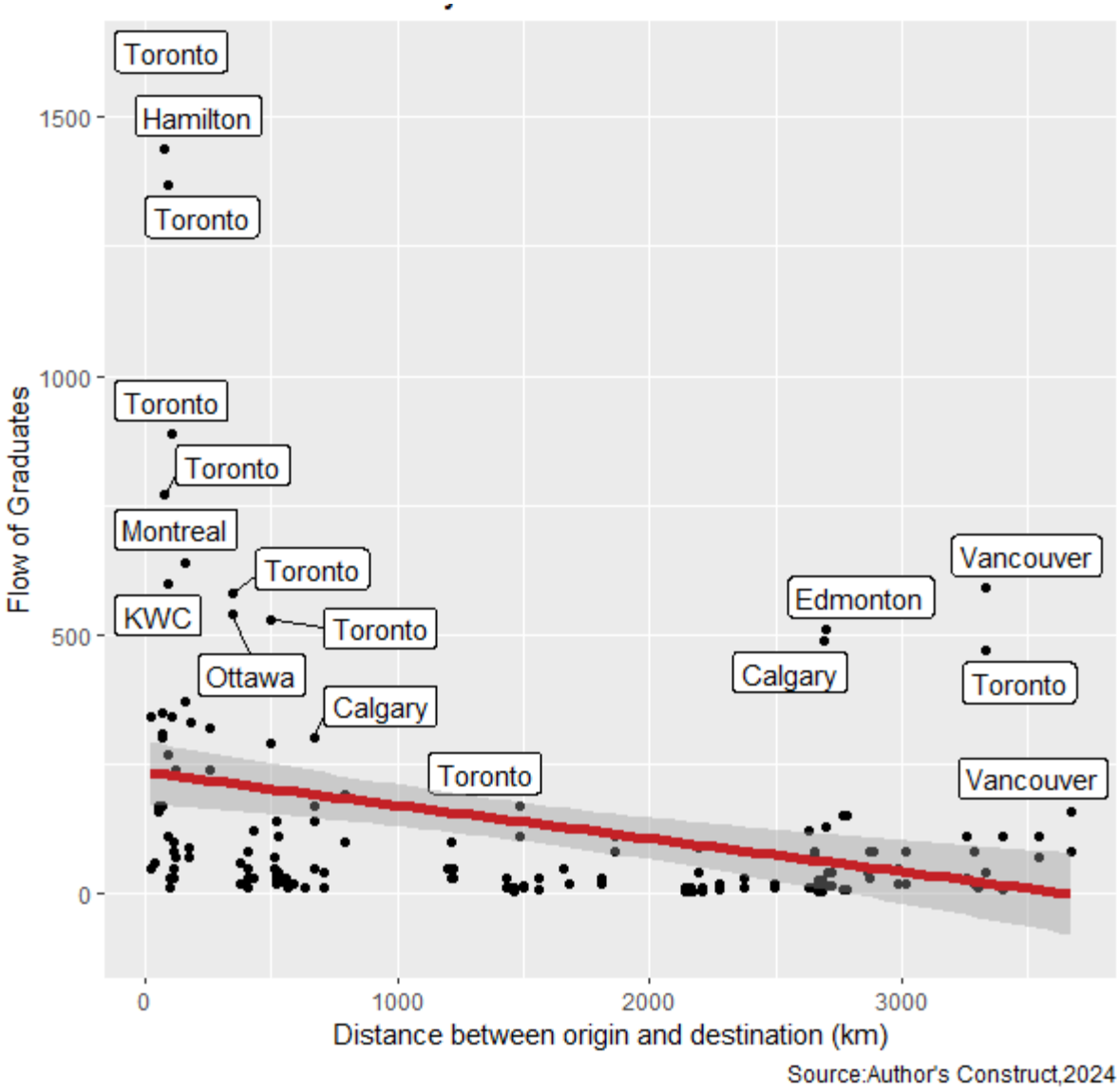
Source:Author's Construct,2024

Figure 4. 3: Scatterplot of Migratory flows of Postsecondary Graduates in 2016 as against Distance



Source:Author's Construct,2024

Figure 4. 4: Scatterplot of Migratory flows of Postsecondary Graduates in 2019 as against Distance



The distance decay effect examines the relationship between two locations and the impact of distance on their interaction. The interaction between two locations diminishes as distance increases. In both figures above, the trends in both years are very consistent. However, a few outlier locations deviate from the principle. For example, the routes from Toronto to Calgary, Toronto to Edmonton, and Toronto to Vancouver exhibit significant deviation due to the considerable distance between these locations, despite the high level of interaction they experience. The study may not provide definitive reasons for this occurrence. However, a notable trend observed is that Toronto and Vancouver, the two largest CMAs, are located at opposite ends of continent yet exhibit significant

interactions. Further, A notable trend observed is that Toronto, as the largest CMA, experienced interactions with midsized CMAs such as Calgary and Edmonton, which are also geographically distant.

4.11 Distance Decay Factor: Relationship between Migrants (Graduates) flow and Distance

Early studies have indicated that distance plays a crucial role in the movement of people within a country (Ravenstein, 1885). Empirical data suggests that distance has a significant role in discouraging the movement of people from one place to another (Olsson 1965). Distance has had a crucial influence in the formation of the migration literature. Prior studies conducted by Zipf, (1946) and Stillwell and Congdon (1991) have provided explanations for the patterns of migration between different locations. The thesis went beyond by explaining the consequences of the geographical distance between the regions and its impact on migratory patterns. It is important to mention that it was very consistent with literature. Regions that were geographically distant had lower levels of mobility between them. Typically, the closer the locations are, the greater the probability of migration flow. For instance, the number of individuals who relocated from Vancouver to London in 2016 and had recently completed their studies was 20. Nevertheless, in 2019, the figure rose to 30. The distance[2] between Vancouver and London is 3,253.736 kilometres. In 2016, there were 1620 graduates who relocated from London to Toronto. By 2019, however this number had declined to 1600. The distance separating Toronto and London measures 178.830 kilometres. This phenomenon is observed in most of the regions.

The distance decay concept suggests that the level of interaction between both locations decreases as the distance between them rises. Significantly, in 2016, the majority of interactions conformed to the distance decay concept. Nevertheless, there were exceptions for destinations such as Calgary, Edmonton, Vancouver, and Toronto. The migration of graduates from Toronto to Calgary, Edmonton, and Vancouver underwent a deviation from the established principles. The migration of graduates from Vancouver to Toronto also witnessed a departure from the theory of distance decay. In 2019, a

[2] The distance between the regions considered the centroid of the CMAs and the straight line method

comparable pattern was observed, which is not significantly distinct from the identical occurrence witnessed in 2016. The outlier movements experienced in 2016 are same. During both years, 44.23% of all movements took place within a distance of 1000 kilometres. Once again, 59.62% of the migratory flows took place within a distance of 2000 kilometres. Finally, 88.46% of the flows within CMAs occurred within a distance of 3000 kilometres.

Chapter 5
Discussion and Conclusion

5.1 Introduction

This study was motivated by the absence of literature on the migration patterns of postsecondary graduates across Canada, both in terms of numerical data and visual depiction in matrix form. Again, this thesis is based on the observation that there was a lack of research on graduate retention at the regional level in Canada. The motivation for this study stems from the scarcity of literature that examines the measurable effects of graduate retention in different locations, particularly in Census Metropolitan Areas (CMAs). Thus far, Narh & Buzzelli (2022) have conducted research on the interprovincial movement of postsecondary students. This required a closer examination of the influence of graduate retention at a more detailed level, specifically at the CMA level. In order to address the pertinent question the study seeks to answer the question - What spatial patterns emerge in the post-graduation trajectories of postsecondary graduates? - The question explores the movement patterns of postsecondary students (including both college and university graduates) who completed their studies in the years 2013, 2014, and 2015, and examines their respective locations of residence in 2016 and 2019. In order for societies or regions to experience growth, it is necessary to have the necessary human capital to foster that growth (Beckstead et al., 2008). Human capital is essential for effectively managing all the elements of production in order to generate value. Given Canada's low birth rate crisis, it is crucial for governments, municipalities, and universities to devise strategies for the equitable distribution of highly trained workers throughout the country. However, universities and colleges are not obligated to evenly disperse the skilled labour force. Postsecondary institutions primarily exist to educate and prepare the next generation of skilled workers. The presence of universities and colleges in a region acts as a strong attraction for students. Governments should take advantage of this chance to establish partnerships between postsecondary institutions and business in order to retain graduates after they finish their training, thus improving regional competitiveness (Etzkowitz & Dzisah, 2008; Leibovitz, 2003; Smith & Bagchi-Sen, 2010). Canada is predominantly service-based economy exhibits a significant connection between a well-trained workforce and a robust research and development foundation (Auriol, 2010).Based on the literature on human capital development in

Canada and the findings of this study, it is observed that individuals with high levels of skills and expertise are more likely to reside in major urban areas, while only a small number of them choose to live in medium and small-sized cities (Beckstead et al., 2008). This phenomenon can be mostly linked to the higher wages that are typically associated with residing in greater urban regions (Polese & Shearmur, 2006).

The Research Data Centre of Statistics Canada at Western University provided the PSIS and T1FF data that made this study feasible. Since the collection of PSIS and T1FF datasets is required, there was a significant likelihood that all students would be included in the data. The study specifically targets students who completed their studies between 2013 and 2015 and also submitted their tax returns in 2016 and 2019. An exhaustive analysis revealed that the Education and Labour Market Longitudinal Platform (ELMLP), which encompasses the PSIS and T1FF datasets, is the most optimal platform for monitoring the movement of graduates. The PSIS includes but not limited sociodemographic statistics, postal codes of postsecondary institutions, information on study programmes, and student status (domestic or international). The ELMLP offers a conducive setting for gaining a deeper comprehension of the shift from Canadian education and training courses to the job market. Nevertheless, the number of students who submit taxes while still in school is small (Choi et al., 2023). A total of thirteen CMAs were chosen for the study to represent the overall graduate mobility trends in Canada.

Overall, the migratory patterns of postsecondary graduates in Canada consistently demonstrate certain trends and provide valuable insights into the geographical mobility of graduates. The important findings emphasise the significant importance of large urban regions, the influence of distance on movement, and the rates at which graduates stay in the locations where they studied.

5.2 Retention in regions of study and Major Metropolitan Areas

The majority of graduates tend to remain in the same location where they completed their studies, as indicated by the data. However, individuals who choose to relocate typically go towards prominent urban centres like Toronto, Montreal, and Vancouver. Toronto, Montreal, and Vancouver continually stand out as the main centres for retaining and attracting graduates. In both 2016 and 2019, Toronto, being the largest and most

important economic hub, had the greatest retention rate among graduates. Montreal also shown robust retention, with significant movement to other major cities such as Toronto, Ottawa, and Vancouver. The fact that Vancouver is able to attract and retain graduates highlights its attractiveness as a desirable location for living and working. This is further reinforced by the substantial influx of people from other areas.

5.3 Intra Provincial Migration

The data emphasises strong movement inside the province of Alberta, specifically within its boundaries. Calgary and Edmonton graduates frequently move within the province, demonstrating robust economic and social connections. The interconnectivity of economic centres in Ontario, namely between Toronto and neighbouring cities like Hamilton and the Kitchener-Waterloo-Cambridge (KWC) region, is evident in the movement of people also within the province.

5.4 Distance Decay Factor

An important observation pertains to the influence of distance on the mobility of graduate students. The scatter plot and subsequent analysis validate that there is a negative correlation between mobility and distance, in accordance with the principle of distance decay. Graduates typically relocate to neighbouring cities, resulting in substantial migration patterns within a radius of 1000 kilometres. Nevertheless, there are observed variations, namely in the case of individuals moving from Toronto to Calgary, Toronto to Edmonton, and Toronto to Vancouver. This suggests that factors more than just distance, such as economic prospects and cultural appeal, also have a significant impact.

Although the general patterns stay stable from 2016 to 2019, there are significant variations in the extent of graduate movements. The population of graduates living in the major CMAs experienced a marginal increase, indicating a continued trend of talent concentration in these urban areas. Montreal witnessed a substantial rise in the number of graduates choosing to stay in the city, whilst areas such as Vancouver, Winnipeg, and Edmonton observed a decrease in graduate retention. The cities of Calgary, Ottawa, and Hamilton demonstrate their economic and social stability by their consistent rates of retaining and attracting residents.

5.5 Discussion

The current study aims to track the movement of individuals who have completed their education at postsecondary institutions, both one year and four years after graduation. Typically, the data indicates that the majority of graduates tend to remain in close proximity of their postsecondary schools. The literature strongly supports the idea that a significant number of graduates choose to remain in their location after graduation, particularly those who did not relocate for educational purposes (Newbold, 2017). This is supported by Frenette (2004), who argues that the distance plays a significant role in determining access to higher education. Graduates tend to avoid relocating long distances due to the costs involved. They have a preference for receiving education inside their home region. Additionally, it aligns with the findings of Newbold's (2017) research, which identified family and social ties as the second most significant factor preventing relocation. Additionally, it suggests that the majority of graduates do not relocate in order to pursue higher education. Recent graduates may have chosen to migrate away from home due to their preference for attending a specific university or living independently. Additionally, those living in rural or remote areas of Canada may have needed to relocate in order to access educational opportunities (Newbold, 2017; Turcotte, 2006). According to the research, it is evident that graduates are more inclined to relocate due to job prospects, and the lack of employment chances is likely to reduce their likelihood of moving. This is supported by studies conducted by (Brown & Scott, 2012; Chen & Rosenthal, 2008; Darchen & Tremblay, 2010; Newbold, 2017). Additionally, it is important to acknowledge that individuals with advanced education tend to choose to reside in large urban centres due to the positive relationship between these regions and their income levels. Highly skilled individuals who are new to their careers typically receive a compensation rise of 5-6% compared to their peers in smaller or mid-sized cities(Ahlin et al., 2014).This undermines the impact of network effects and the potential for professional growth often offered by larger urban areas. Research indicates that the most desirable places for this knowledge-intensive activity are major urban centres (O'Hagan & Rutland, 2008).

It is noteworthy that certain graduates relocate to different places in order to pursue further education, particularly those pursuing master's and doctoral degrees. They have the highest degree of mobility in terms of postsecondary migration. They relocate due to

the specific programmes of study and research affiliated with a particular Higher Education Institution (HEI). Once again, certain individuals with advanced education relocate in order to secure funding for their preferred degrees (Narh & Buzzelli, 2022; Newbold & Brown, 2015).

The limited migration of graduates to Quebec can be attributed to the cultural, historical, and linguistic restrictions present in the province (Amirault et al., 2013; Helliwell, 1997; Narh & Buzzelli, 2022). Non-natives of the provinces face challenges when trying to remain in the area. However, there are some instances of residents relocating back to the province, which is likely due to individuals who relocated to other provinces for educational purposes and are now returning. This aligns with the existing research on higher education. Many graduates frequently engage in return migration after completing their education (Newbold, 2017).

The distance decay effect significantly influenced the migration of graduates. There was a significant increase in intra-provincial movement, mainly in Alberta and Ontario. This explains the phenomenon that these economic hubs may have generated a beneficial interaction where migrants were aware of the facilities and employment opportunities in those places (Amirault et al., 2013; Bunea, 2012).Nevertheless, a few graduates managed to overcome significant challenges and relocated from Toronto CMA to mostly Edmonton and Calgary, which deviated from the typical migration patterns described in the literature. The accessibility of information through Information Technology is likely to enable effective cost management for far away cities. Once again, there was a steady migration of graduates from Toronto to Vancouver. This trend is observed despite the fact that both cities are the largest Census Metropolitan Areas (CMAs) in Canada. This finding is also supported by previous research conducted by (O'Hagan & Rutland, 2008).

According to the literature, the specific study programme that a graduate studies can have an impact on their desire to migrate. For example, individuals who have obtained a degree, particularly those with a master's or doctoral degree, are the most mobile demographic (Newbold, 2017). Nevertheless, individuals working in the trades exhibit a lower propensity to migrate (Turcotte and Weeks 2014).Furthermore, it is apparent that trades that are predominantly male, such as pipefitters, tend to have higher mobility

within the trades. Conversely, crafts that are dominated by women, such as hairstylists, are less likely to have such high mobility (Haan et al., 2023).

Socio-demographic factors significantly impact graduate mobility, with the age of graduates being a particularly influential factor. Younger individuals, typically between the ages of 20-29, tend to have higher levels of mobility, as supported by studies conducted by (Haan et al., 2023; Newbold, 2017; Paquin,2009; Wilson, 2015). Typically, part-time students are less inclined to be mobile as they are often content with their professions. Full-time students are generally more mobile as they have not yet entered the workforce. After completing their studies, they often seek places that provide them with the most prospects, typically aligned with their field of study. Additionally, the marital status of the graduate is also expected to impact the mobility of the graduates. For instance, once the graduate is married and has children, they typically seek stability for their family, making them less inclined to relocate frequently. However, an individual is more inclined to desire mobility. Nevertheless, it is apparent that unmarried women, regardless of their marital status, exhibit lower levels of mobility (Haan et al., 2023; Morissette, 2017). In contrast to earlier studies, Faggian et al., (2007) argues that females have a higher probability of migrating after completing their education. Another factor of interest is the migration status of the graduates. Graduates who belong to visible minority groups are less inclined to relocate elsewhere compared to Canadian-born individuals (Newbold, 2017;Turcotte and Week 2014).The primary rationale behind this behaviour is that individuals are inclined to remain within their communities due to the high probability of acquiring useful knowledge that can ultimately result in employment opportunities, thereby enabling them to reap the benefits of such associations (Li 2009; Newbold, 2017).

Skilled workers with degrees exhibit varying mobility patterns. Individuals possessing STEM degrees tend to relocate to and remain in regions where similarly trained professionals cluster (Wright and Ellis 2019). Gertler and colleagues assert that high technology industries tend to cluster in specific locations, leading workers in this sector to remain in those regions and develop their careers (Gertler et al 2014). STEM degree holders are more likely to move further compared to those without STEM qualifications

(Wright and Ellis 2019). They find that regions capable of attracting and retaining degree holders can also attract both STEM and non-STEM graduates.

As the governance of postsecondary institutions falls under provincial jurisdiction, certain provinces have imposed restrictions to limit the enrolment of out-of-province students. Quebec has raised tuition for out-of-province students by 33% (Global News, 2024). This may dissuade talented people from viewing the province as attractive.

5.6 Limitation

The study did not examine the tendency of graduates to return to their home region, making it challenging to ascertain whether they engaged in return migration to their original locations after the completion of their education and training.

The study primarily focuses on describing the phenomenon, making it challenging to evaluate the impact of socio-demographic factors on graduate mobility and retention. Moreover, a significant number of students failed to file their tax returns, making it challenging to track their movement. Another challenging aspect was that due to students/graduates not filing their taxes, it became difficult to meet the vetting guidelines set forth by Statistics Canada in order to extract the findings. As a result, certain sections of the matrix had to be merged to fulfil these requirements.

Only the top thirteen CMAs with the highest flows were listed due to the encountered challenges. Despite being included in the appendix, the rest of the information hindered the ability to present a more distinct understanding of graduate retention in Canada.

Additionally, the PSIS was unable to encompass all students or graduates nationwide. For example, there is no current record of students attending Saint John's in New Brunswick for the cohorts understudy. However, there is a postsecondary institution (New Brunswick Community College) located in that particular city region.

The emergence of online courses has resulted in some graduates not relocating to the regions of their postsecondary schools. Consequently, comprehending the data from the perspective of attraction was challenging. Some graduates appear to retain their familial residences rather than their actual locations hence making the attraction side of graduates somewhat difficult. This may potentially distort the data and analysis.

5.7 Areas of Future Research

A qualitative study could be conducted to investigate the reasons behind graduates' inclination to relocate from the Greater Toronto Area (GTA) to the province of Alberta. It would be intriguing to ascertain the underlying factors driving these changes, as they appear to deviate significantly from the existing body of knowledge. Future research could focus on examining the impact of colleges or universities on graduate retention in certain regions throughout the country.

It will be interesting to observe how graduates' post Covid-19 choices about relocation to major cities are influenced by the fact that these locations provide initial incomes that are 5-6% higher than other regions (Ahlin et al., 2014). Following the Covid-19 pandemic, costs associated with living in these major CMAs have significantly increased, particularly in regards to housing. It would be interesting to ascertain the factors that will drive graduates to either remain in major cities or choose for relocation to medium-sized cities.

5.8 Policy Recommendation

Based on the study and discussions, it is clear that the majority of graduates stay. Various levels of government should align their policies to meet the goal of retention of skilled workers/talents. Provincial and municipal governments have the potential to collaborate with industry stakeholders in order to attract businesses to establish themselves in regions. These corporations could get significant incentives, such as tax reductions or rebates, for some number of years especially for small and midsized cities.

Cities play a crucial role in driving modern change. To effectively lead this change, cities must utilise their governance structures to collaborate with industries. This collaboration will enable cities to be highly competitive, taking into account regional differences and avoiding a one-size-fits-all approach (Bradford & Bramwell, 2014).

The majority of graduates choose to remain in the same location where they completed their studies (Frenette, 2004). Policymakers should prioritise the development of specific policies that align with the needs of students during their time in school and their transition into the labour market. These policies should also facilitate the creation of startups in the cities so they benefit from the concentration of talents in the postsecondary

region. High graduate retention can be achieved when these approaches are effectively integrated.

Local businesses should offer internships and cooperative placements to students attending postsecondary schools in their local area. This would allow students to get familiar with local job options and decrease the likelihood of them seeking opportunities elsewhere. Additionally, it offers networking opportunities for students while they are attending school. Upon graduation, individuals find it far more convenient to obtain local employment due to their prior work experiences.

Literature Citations

Abel, J. R., & Deitz, R. (2012). The Role of Colleges and Universities in Building Local Human Capital. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1952100

Abreu, M., Faggian, A., & McCann, P. (2015). Migration and inter-industry mobility of UK graduates. Journal of Economic Geography, 15(2), 353–385.

Abreu, M., Koster, S., & Venhorst, V. A. (2014). Transitions and Location Choice: Analysing the Decisions of Students and Recent Graduates. Spatial Economic Analysis, 9(4), 349–354. https://doi.org/10.1080/17421772.2014.965552

Ahlin, L., Andersson, M., & Thulin, P. (2014). Market Thickness and the Early Labour Market Career of University Graduates: An Urban Advantage? Spatial Economic Analysis, 9(4), 396–419. https://doi.org/10.1080/17421772.2014.961534

Albouy, D., Leibovici, F., & Warman, C. (2013). Quality of life, firm productivity, and the value of amenities across Canadian cities. Canadian Journal of Economics/Revue Canadienne d'économique, 46(2), 379–411. https://doi.org/10.1111/caje.12017

Amin, A. (1999). An Institutionalist Perspective on Regional Economic Development. International Journal of Urban and Regional Research, 23(2), 365–378. https://doi.org/10.1111/1468-2427.00201

Amin, A., & Hausner, J. (1997). Beyond Market and hierarchy. Edward Elgar Publishing. https://econpapers.repec.org/bookchap/elgeebook/1147.htm

Amirault, D., de Munnik, D., & Miller, S. (2013). Explaining Canada's Regional Migration Patterns.

Andersen, K. V., Bugge, M. M., Hansen, H. K., Isaksen, A., & Raunio, M. (2010a). One Size Fits All? Applying the Creative Class Thesis onto a Nordic Context. European Planning Studies, 18(10), 1591–1609. https://doi.org/10.1080/09654313.2010.504343

Andersen, K. V., Hansen, H. K., Isaksen, A., & Raunio, M. (2010b). Nordic City Regions in the Creative Class Debate—Putting the Creative Class Thesis to a Test. Industry & Innovation, 17(2), 215–240. https://doi.org/10.1080/13662711003633496

Andrew, C., & Doloreux, D. (2012). Economic Development, Social Inclusion and Urban Governance: The Case of the City-Region of Ottawa in Canada. International Journal of Urban and Regional Research, 36(6), 1288–1305. https://doi.org/10.1111/j.1468-2427.2011.01025.x

Artz, G., & Yu, L. (2011). How ya Gonna Keep 'em Down on the Farm: Which Land Grant Graduates Live in Rural Areas? Economic Development Quarterly, 25(4), 341–352. https://doi.org/10.1177/0891242411409399

Asheim, B., & Hansen, H. K. (2009). Knowledge Bases, Talents, and Contexts: On the Usefulness of the Creative Class Approach in Sweden. Economic Geography, 85(4), 425–442. https://doi.org/10.1111/j.1944-8287.2009.01051.x

Auriol, Laudeline. (2010). Careers of Doctorate Holders: Employment and Mobility Patterns. Paris, OECD, 29 p. Science, Technology and Industry Working Paper Series, no. 2010/4.

Ballarino, G., Colombo, S., Panichella, N., & Piolatto, M. (2022). Human capital dynamics: The geographical mobility of high-school graduates towards university in Italy. Regional Studies, 56(6), 921–939. https://doi.org/10.1080/00343404.2021.1912723

Barnett, R. (2004). The purposes of higher education and the changing face of academia. London Review of Education, 2(1). https://journals.uclpress.co.uk/lre/article/id/2464/

Beckstead, D., Brown, W. M., & Gellatly, G. (2008). The Left Brain of North American Cities: Scientists and Engineers and Urban Growth. International Regional Science Review, 31(3), 304–338. https://doi.org/10.1177/0160017608318521

Benedict, M. E., McClough, D., & Hoag, J. (2012). STEM: A path to self-employment & jobs? Journal of Entrepreneurship Education, 15. https://www.researchgate.net/profile/Mary-Ellen-Benedict-2/publication/263082616_STEM_A_Path_to_Self-Employment_Jobs/links/656504d03fa26f66f430fbde/STEM-A-Path-to-Self-Employment-Jobs.pdf

Berry, C. R., & Glaeser, E. L. (2005). The divergence of human capital levels across cities. Papers in Regional Science, 84(3), 407–444.

Böckerman, P., & Haapanen, M. (2013). The effect of polytechnic reform on migration. Journal of Population Economics, 26(2), 593–617. https://doi.org/10.1007/s00148-012-0454-4

Bradford, N., & Bramwell, A. (2014). Governing Urban Economies: Innovation and Inclusion in Canadian City-Regions. In Governing Urban Economies. University of Toronto Press. https://doi.org/10.3138/j.ctt6wrf75.5

Bradford, N., & Bramwell, A. (2016). Regional economic development: Institutions, innovation and policy. In R. Shearmu, C. Carrincazeaux, & D. Doloreux (Eds.), Handbook on the Geographies of Innovation. Edward Elgar Publishing. https://doi.org/10.4337/9781784710774.00033

Bramwell, A., Nelles, J., & Wolfe, D. A. (2008). Knowledge, Innovation and Institutions: Global and Local Dimensions of the ICT Cluster in Waterloo, Canada. Regional Studies, 42(1), 101–116. https://doi.org/10.1080/00343400701543231

Bramwell, A., & Wolfe, D. A. (2008). Universities and regional economic development: The entrepreneurial University of Waterloo. Research Policy, 37(8), 1175–1187. https://doi.org/10.1016/j.respol.2008.04.016

Breznitz, S. M., & Zhang, Q. (2020). Determinants of graduates' entrepreneurial activity. Small Business Economics, 55(4), 1039–1056. https://doi.org/10.1007/s11187-019-00171-8

Brown, W. M., & Scott, D. M. (2012). HUMAN CAPITAL LOCATION CHOICE: ACCOUNTING FOR AMENITIES AND THICK LABOR MARKETS*. Journal of Regional Science, 52(5), 787–808. https://doi.org/10.1111/j.1467-9787.2012.00772.x

Bunea, D. (2012). Modern Gravity Models of Internal Migration. The Case of Romania.

Calgary Economic Development (2022) Highlights https://www.calgaryeconomicdevelopment.com/assets/Uploads/CED-2023_Highlights2022-Web.pdf Accessed October 4,2024

Canada Post (2016) Canada Post Corporation https://www.canadapost-postescanada.ca/scp/doc/fr/soutien/bc/stpn/liste-des-rta-avril-2022.pdf

Chen, Y., & Rosenthal, S. S. (2008). Local amenities and life-cycle migration: Do people move for jobs or fun? Journal of Urban Economics, 64(3), 519–537. https://doi.org/10.1016/j.jue.2008.05.005

Choi, Y., Hou, F., & Chan, P. C. W. (2023). Early earnings trajectories of international students after graduation from postsecondary programs: Evidence from Canadian administrative

data. Education Economics, 31(4), 510–530. https://doi.org/10.1080/09645292.2022.2102151

Ciriaci, D. (2014). Does University Quality Influence the Interregional Mobility of Students and Graduates? The Case of Italy. Regional Studies, 48(10), 1592–1608. https://doi.org/10.1080/00343404.2013.821569

City of Edmonton Corporate Workforce Plan 2015-2020 https://www.edmonton.ca/public-files/assets/document?path=PDF/corporate_workforce_plan.pdf Accessed October,2024

City of Guelph (2019) Strategic Plan 2019-2023 https://guelph.ca/wp-content/uploads/StrategicPlan_2019.pdf Accessed October 5, 2024

City of Guelph (2013) Foreign Direct Investment (FDI) Attraction and Retention Strategy and Action Plan for Guelph 2014-2016 https://guelph.ca/wp-content/uploads/GuelphFDIAttractionRetentionStrategyActionPlan.pdf Accessed October 4,2024

City of London (2023) Strategic Plan 2023-2027, City of London https://london.ca/sites/default/files/2023-06/CofL_StrategicPlan_Digital-V4.pdf

City of Ottawa (2023) Strategic Plan 2023-2026 https://documents.ottawa.ca/sites/default/files/StrategicPlan_2023-2026_EN.pdf Accessed October 4,2024

City of Saskatoon (2023) Annual Report 2023 https://www.saskatoon.ca/sites/default/files/documents/asset-financial-management/finance-supply/COS_2023-AnnualReport-Aug29-FINAL-web.pdf Accessed October 4,2024

City of Saskatoon (2022) Strategic Plan 2022-2025 https://www.saskatoon.ca/sites/default/files/documents/2022-2025_strategic_plan.pdf Accessed October 4, 2024

City of St Catharines (2023) Strategic Plan 2023-2027 https://www.stcatharines.ca/en/council-and-administration/resources/Documents/Documents/STC-Strategic-Plan_2023-to-2027_V4.pdf Accessed October 4,2024

St Catharines (2019) Strategic Plan 2019-2028 https://www.stcatharines.ca/en/council-and-administration/resources/Documents/StratPlan-2019.pdf Accessed October 4, 2024

City of Toronto (2014) Talent Blueprint 2014-2018 https://www.toronto.ca/wp-content/uploads/2017/10/8ed1-Final-Talent-Blueprint-AODA-compliant.compressed.pdf Accessed October 2,2024

City of Vancouver (2019) Economic Development in Vancouver :Building a Prosperous,Equitable and Resilient Economy through Collaboration https://canadianaam.com/wp-content/uploads/2021/05/Copy-of-Economic-Development-in-Vancouver-June-25th-2019.pdf Accessed October 4,2024

Clifton, N. (2013). Location, quality of place, and outcomes: Applying the '3Ts' model to the UK. In The creative class goes global (pp. 183–209). Routledge. https://api.taylorfrancis.com/content/chapters/edit/download?identifierName=doi&identifierValue=10.4324/9780203094945-11&type=chapterpdf

Clifton, N. (2008). The "creative class" in the uk: An initial analysis. Geografiska Annaler: Series B, Human Geography, 90(1), 63–82. https://doi.org/10.1111/j.1468-0467.2008.00276.x

Corcoran, J., & Faggian, A. (2017). Graduate migration and regional development: An international perspective. In J. Corcoran & A. Faggian, Graduate Migration and Regional Development (pp. 1–10). Edward Elgar Publishing. https://doi.org/10.4337/9781784712167.00005

Crescenzi, R., Holman, N., & Orru', E. (2017). Why do they return? Beyond the economic drivers of graduate return migration. The Annals of Regional Science, 59(3), 603–627. https://doi.org/10.1007/s00168-016-0762-9

Darchen, S., & Tremblay, D.-G. (2010). What attracts and retains knowledge workers/students: The quality of place or career opportunities? The cases of Montreal and Ottawa. Cities, 27(4), 225–233. https://doi.org/10.1016/j.cities.2009.12.009

David, A., & Coenen, F. (2014). Alumni Networks—An Untapped Potential to Gain and Retain Highly-Skilled Workers? Higher Education Studies, 4(5), p1. https://doi.org/10.5539/hes.v4n5p1

Dotti, N. F., Fratesi, U., Lenzi, C., & Percoco, M. (2013). Local Labour Markets and the Interregional Mobility of Italian University Students. Spatial Economic Analysis, 8(4), 443–468. https://doi.org/10.1080/17421772.2013.833342

Economic Development and Tourism Strategy (2024) St Catharines Economic Development and Tourism Strategy 2024-2029 https://www.investinstc.ca/files/2024-2029St.CatharinesEconomicDevelopmentandTourismStrategy.pdf Accessed October 5, 2024

Economic Development Winnipeg (2019) Quarterly report on progress https://www.economicdevelopmentwinnipeg.com/uploads/document/03458_edw_community_report_q3_19.t1571755133.pdf Accessed October 2,2024

Economic Development Winnipeg (2023) Annual Report https://www.economicdevelopmentwinnipeg.com/uploads/document/edw_2023_annual_report_05_24.t1720201996.pdf Accessed October 3,2024

Ehrke, J., Hastings, L., Balschweid, M., Brodersen, A., & Burkhart-Kriesel, C. (2022). Examining migration factors among generative college graduates: Strategic implications for people attraction, retention, and leadership transfer efforts. Community Development, 53(4), 460–476. https://doi.org/10.1080/15575330.2021.1975790

Etzkowttz, H. (1989). Entrepreneurial science in the academy: A case of the transformation of norms. Social Problems, 36(1), 14–29.

Etzkowitz, H., & Dzisah, J. (2008). Rethinking development: Circulation in the triple helix. Technology Analysis & Strategic Management, 20(6), 653–666. https://doi.org/10.1080/09537320802426309

Evers, G. (2019). The impact of the establishment of a university in a peripheral region on the local labour market for graduates. Regional Studies, Regional Science, 6(1), 319–330. https://doi.org/10.1080/21681376.2019.1584051

Faggian, A., Corcoran, J., & Franklin, R. S. (2017). Human-capital migration and salaries: An examination of US college graduates. In J. Corcoran & A. Faggian (Eds.), Graduate Migration and Regional Development. Edward Elgar Publishing. https://doi.org/10.4337/9781784712167.00014

Faggian, A., Comunian, R., & Li, Q. C. (2014). Interregional migration of human creative capital: The case of "Bohemian graduates". Geoforum, 55, 33–42. https://doi.org/10.1016/j.geoforum.2014.05.003

Faggian, A., & Mccann, P. (2009). UNIVERSITIES, AGGLOMERATIONS AND GRADUATE HUMAN CAPITAL MOBILITY. Tijdschrift Voor Economische En Sociale Geografie, 100(2), 210–223. https://doi.org/10.1111/j.1467-9663.2009.00530.x

Faggian, A., McCann, P., & Sheppard, S. (2007). SOME EVIDENCE THAT WOMEN ARE MORE MOBILE THAN MEN: GENDER DIFFERENCES IN U.K. GRADUATE MIGRATION BEHAVIOR. Journal of Regional Science, 47(3), 517–539. https://doi.org/10.1111/j.1467-9787.2007.00518.x

Fallis, G. (2007). Multiversities, ideas, and democracy. University of Toronto Press.

Fernandez-Guerrero, D., & Evers, G. (2018). Co-creation of localised capabilities between universities and nascent industries: The case of Aalborg University and the North Denmark Region. https://research.utwente.nl/en/publications/co-creation-of-localised-capabilities-between-universities-and-na

Fiore, A. M., Niehm, L. S., Hurst, J. L., Son, J., Sadachar, A., Russell, D. W., Swenson, D., & Seeger, C. (2015). Will They Stay or Will They Go? Community Features Important in Migration Decisions of Recent University Graduates. Economic Development Quarterly, 29(1), 23–37. https://doi.org/10.1177/0891242414559070

Florida, R. (2017). The new urban crisis : how our cities are increasing inequality, deepening segregation, and failing the middle class-- and what we can do about it /. Basic Books,

Florida, R. (2002). The Economic Geography of Talent. Annals of the Association of American Geographers, 92(4), 743–755. https://doi.org/10.1111/1467-8306.00314

Florida, R., Gates, G., Knudsen, B., & Stolarick, K. (2006). The university and the creative economy. Retrieved from https://creativeclass.com/rfcgdb/articles/University%20For%20City%20and%20Community%204.pdf

Florida, R., Mellander, C. P. A., & Stolarick, K. M. (2010). Talent, technology and tolerance in Canadian regional development: Talent, technology and tolerance. The Canadian Geographer / Le Géographe Canadien, 54(3), 277–304. https://doi.org/10.1111/j.1541-0064.2009.00293.x

Frenette, M. (2006). Too Far to Go On? Distance to School and University Participation. Education Economics, 14(1), 31–58. https://doi.org/10.1080/09645290500481865

Frenette, M. (2004). Access to College and University: Does Distance to School Matter? Canadian Public Policy / Analyse de Politiques, 30(4), 427. https://doi.org/10.2307/3552523

Gerard, M., & van Woerkens, C. (2014). Tolerance, aesthetics, amenities or jobs?: The attraction of the Dutch city to the creative class. In The Creative Class Goes Global (1st ed., pp. 138–163). Routledge. https://doi.org/10.4324/9780203094945-9

Gertler, M. S., Geddie, K., Hatch, C., & Rekers, J. V. (2014). 1 Attracting and Retaining Talent: Evidence from Canada's City-Regions. In J. Grant (Ed.), Seeking Talent for Creative Cities (pp. 3–30). University of Toronto Press. https://doi.org/10.3138/9781442667938-006

Glaeser, E. L. (2004). Review of the book The rise of the creative class, by R. Florida. Retrieved from http://creativeclass.com/rfcgdb/articles/GlaeserReview.pdf

Global News (2024) Quebec going ahead with out-of-province tuition hikes despite advisory body concern https://globalnews.ca/news/10271769/quebec-hike-tutition-out-of-province-canadian-students/ Accessed September 28, 2024

Goldstein, H., & Drucker, J. (2006). The Economic Development Impacts of Universities on Regions: Do Size and Distance Matter? Economic Development Quarterly, 20(1), 22–43. https://doi.org/10.1177/0891242405283387

Gottlieb, P. D., & Joseph, G. (2006). COLLEGE-TO-WORK MIGRATION OF TECHNOLOGY GRADUATES AND HOLDERS OF DOCTORATES WITHIN THE UNITED STATES. Journal of Regional Science, 46(4), 627–659. https://doi.org/10.1111/j.1467-9787.2006.00471.x

Grant, J. L., & Kronstal, K. (2010). The social dynamics of attracting talent in Halifax. Canadian Geographies / Géographies Canadiennes, 54(3), 347–365. https://doi.org/10.1111/j.1541-0064.2010.00310.x

Groen, J. A., & White, M. J. (2004). In-state versus out-of-state students: The divergence of interest between public universities and state governments. Journal of Public Economics, 88(9–10), 1793–1814.

Guo, J., & Fast, V. (2019). Growing up, growing out: Comparing spatial patterns of urban populations in Canada. Geomatica, 73(2), 45–61.

Gyourko, J., & Tracy, J. (1991). The Structure of Local Public Finance and the Quality of Life. Journal of Political Economy, 99(4), 774–806. https://doi.org/10.1086/261778

Haan, M., Jin, H., & Paul, T. (2023). The Mobility of Construction Workers in Canada: Insights from Administrative Data. Applied Spatial Analysis and Policy, 16(1), 91–118. https://doi.org/10.1007/s12061-022-09445-3

Haapanen, M., & Tervo, H. (2009). Return and onward migration of highly educated: Evidence from residence spells of Finnish graduates. Jyväskylä: School of Business and Economics, University of Jyväskylä. https://www.academia.edu/download/46556275/Return_and_onward_migration_of_highly_ed20160616-26659-1pk312u.pdf

Haapanen, M., & Tervo, H. (2012). MIGRATION OF THE HIGHLY EDUCATED: EVIDENCE FROM RESIDENCE SPELLS OF UNIVERSITY GRADUATES*. Journal of Regional Science, 52(4), 587–605. https://doi.org/10.1111/j.1467-9787.2011.00745.x

Hamilton's Workforce Strategy (2023) Harnessing the ecosystem for shared success https://investinhamilton.ca/wp-content/uploads/2023/12/Hamilton-Workforce-Strategy-FINAL-9-9-23.pdf Accessed October 4,2024

Hansen, H. K., & Niedomysl, T. (2009). Migration of the creative class: Evidence from Sweden. Journal of Economic Geography, 9(2), 191–206.

Hansen, S. B., Ban, C., & Huggins, L. (2003). Explaining the "Brain Drain" from Older Industrial Cities: The Pittsburgh Region. Economic Development Quarterly, 17(2), 132–147. https://doi.org/10.1177/0891242403017002002

Helliwell, J. F. (1997). National Borders, Trade and Migration. Pacific Economic Review, 2(3), 165–185. https://doi.org/10.1111/1468-0106.00032

Hirst, P. (1994). Associative democracy. Dissent, 41, 241–247.

Imeraj, L., Willaert, D., Finney, N., & Gadeyne, S. (2018). Cities' attraction and retention of graduates: A more-than-economic approach. Regional Studies, 52(8), 1086–1097. https://doi.org/10.1080/00343404.2017.1362499

Jarmon, C. A., Vanderleeuw, J. M., Pennington, M. S., & Sowers, T. E. (2012). The Role of Economic Development Corporations in Local Economic Development: Evidence From Texas Cities. Economic Development Quarterly, 26(2), 124–137. https://doi.org/10.1177/0891242412437877

Kitagawa, F., Marzocchi, C., Sánchez-Barrioluengo, M., & Uyarra, E. (2022). Anchoring talent to regions: The role of universities in graduate retention through employment and entrepreneurship. Regional Studies, 56(6), 1001–1014. https://doi.org/10.1080/00343404.2021.1904136

Kozina, J., & Clifton, N. (2022). City-region or urban-rural framework: What matters more in understanding the residential location of the creative class? https://figshare.cardiffmet.ac.uk/articles/journal_contribution/City-region_or_urban-rural_framework_what_matters_more_in_understanding_the_residential_location_of_the_creative_class_/19174931/1

Krabel, S., & Flöther, C. (2014). Here Today, Gone Tomorrow? Regional Labour Mobility of German University Graduates. Regional Studies, 48(10), 1609–1627. https://doi.org/10.1080/00343404.2012.739282

Krätke, S. (2010). 'Creative Cities' and the Rise of the Dealer Class: A Critique of Richard Florida's Approach to Urban Theory. International Journal of Urban and Regional Research, 34(4), 835–853. https://doi.org/10.1111/j.1468-2427.2010.00939.x

Lawton Smith, H., & Waters, R. (2019). Universities, graduates and local labour markets. http://eprints.bbk.ac.uk/id/eprint/29460/

Leibovitz, J. (2003). Institutional Barriers to Associative City-region Governance: The Politics of Institution-building and Economic Governance in 'Canada's Technology Triangle'. Urban Studies, 40(13), 2613–2642. https://doi.org/10.1080/0042098032000146812

Lepawsky, J., Phan, C., & Greenwood, R. (2010). Metropolis on the margins: Talent attraction and retention to the St. John's city-region: Metropolis on the margins. The Canadian Geographer / Le Géographe Canadien, 54(3), 324–346. https://doi.org/10.1111/j.1541-0064.2010.00315.x

Ley, D. F., & Mutton, T. A. (1991). The service sector and metropolitan development in Canada. In Services and Metropolitan Development (pp. 197–227). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9780203402115-14/service-sector-metropolitan-development-canada-david-ley-thomas-mutton

Li, W. (2009), Ethnoburb: The New Ethnic Community in Urban America, Honolulu, HI: University of Hawaii Press

Liaw, K.L. (1990). Joint Effects of Personal Factors and Ecological Variables on the Interprovincial Migration Pattern of Young Adults in Canada: A Nested Logit Analysis. Geographical Analysis, 22(3): 189-206

Liu, Y., Shen, J., Xu, W., & Wang, G. (2017). From school to university to work: Migration of highly educated youths in China. The Annals of Regional Science, 59(3), 651–676. https://doi.org/10.1007/s00168-016-0753-x

Lorenzen, M., & Andersen, K. V. (2012). Different creative cities: Exploring Danish data to adapt the creative class argument to small welfare economies. Creative Industries Journal, 4(2), 123–136. https://doi.org/10.1386/cij.4.2.123_1

Markusen, A. (2006). Urban Development and the Politics of a Creative Class: Evidence from a Study of Artists. Environment and Planning A: Economy and Space, 38(10), 1921–1940. https://doi.org/10.1068/a38179

Martinez-Fernandez, C., & Sharpe, S. (2008). Intellectual Assets and Knowledge Vitality in Urban Regions: The Role of Universities. In T. Yigitcanlar, K. Velibeyoglu, & S. Baum (Eds.), Creative Urban Regions (pp. 48–64). IGI Global. https://doi.org/10.4018/978-1-59904-838-3.ch003

Marzocchi, C., Kitagawa, F., & Sánchez-Barrioluengo, M. (2019). Evolving missions and university entrepreneurship: Academic spin-offs and graduate start-ups in the entrepreneurial society. The Journal of Technology Transfer, 44(1), 167–188. https://doi.org/10.1007/s10961-017-9619-3

Massey, J., Field, S., & Chan, Y. (2014). Partnering for economic development: How town-gown relations impact local economic development in small and medium cities. Canadian Journal of Higher Education, 44(2), 152–169. https://doi.org/10.47678/cjhe.v44i2.183813

Mcgranahan, D., & Wojan, T. (2007). Recasting the Creative Class to Examine Growth Processes in Rural and Urban Counties. Regional Studies, 41(2), 197–216. https://doi.org/10.1080/00343400600928285

MDB Insights (2015) London's Community Economic Road Map. Inspire, Innovate, Implement. An Economic Strategy 2015-2020 https://www.downtownlondon.ca/wp-content/uploads/2021/01/London_s-Community-Economic-Roadmap-Final-Report-4.pdf

Mellander, C., & Florida, R. (2006). The creative class or human capital. Explaining Regional Development in Sweden. https://www.creativeclass.com/rfcgdb/articles/The_Creative_Class_or_Human_Capital.pdf

Moretti, E. (2004). Estimating the social return to higher education: Evidence from longitudinal and repeated cross-sectional data. Journal of Econometrics, 121(1–2), 175–212. https://doi.org/10.1016/j.jeconom.2003.10.015

Morissette, R. (2017). Barriers to labour mobility in Canada : Survey-based evidence. Economic insights, catalogue no. 11-626-X — No. 076. https://www150.statcan.gc.ca/n1/pub/11-626-x/11-626-x2017076-eng.htm

Narh, E. D., & Buzzelli, M. (2023). Women on the move for science, technology, engineering and mathematics: Gender selectivity in higher education student migration. Higher Education Quarterly, hequ.12483. https://doi.org/10.1111/hequ.12483

Narh, E. D., & Buzzelli, M. (2022). Higher Education Student Migration in Canada: Interprovincial Structure and the Influence of Student Mother Tongue. Canadian Journal of Regional Science, 45(1), 26. https://doi.org/10.7202/1088300ar

Nathan, M. (2008). Creative Class Theory and Economic Performance in UK Cities: In T. Yigitcanlar, K. Velibeyoglu, & S. Baum (Eds.), Creative Urban Regions (pp. 80–93). IGI Global. https://doi.org/10.4018/978-1-59904-838-3.ch005

Ndiangui, P. (2021). From Brain Drain to Brain Gain: The Battle Against Talent Drain. Journal of Culture and Values in Education. https://doi.org/10.46303/jcve.2020.5

Newbold, K. B. (2017). Graduate migration in Canada. In J. Corcoran & A. Faggian, Graduate Migration and Regional Development (pp. 42–58). Edward Elgar Publishing. https://doi.org/10.4337/9781784712167.00007

Newbold, K. B., & Brown, W. M. (2015). THE URBAN–RURAL GAP IN UNIVERSITY ATTENDANCE: DETERMINANTS OF UNIVERSITY PARTICIPATION AMONG CANADIAN YOUTH. Journal of Regional Science, 55(4), 585–608. https://doi.org/10.1111/jors.12197

O'Hagan, S., & Rutland, T. (2008). A Comparison of Canada's Small, Medium, and Large Cities in the Knowledge Economy. Canadian Journal of Urban Research.

O'Neill, M., & Bagchi-Sen, S. (2022). Public universities and human capital development in the United States. GeoJournal, 88(1), 733–751. https://doi.org/10.1007/s10708-022-10636-1

OECD (2011), Regions and Innovation Policy. Paris: Organisation for Economic Co-operation and Development

Olsson, G. (1965). Distance and Human Interaction A Migration Study. Geografiska Annaler: Series B, Human Geography, 47(1), 3–43. https://doi.org/10.1080/04353684.1965.11879282

Østbye, S., Moilanen, M., Tervo, H., & Westerlund, O. (2018). The creative class: Do jobs follow people or do people follow jobs? Regional Studies, 52(6), 745–755. https://doi.org/10.1080/00343404.2016.1254765

Paquin, N. (2009). Mobility of apprenticeship completers in Canada from 2002 to 2007. Education matters: Insights on education, learning and training in Canada, Catalogue No.81-004-X-No. 2. https://www150.statcan.gc.ca/n1/pub/81-004-x/2009002/article/10895-eng.htm

Parker, P. D., Jerrim, J., Anders, J., & Astell-Burt, T. (2016). Does Living Closer to a University Increase Educational Attainment? A Longitudinal Study of Aspirations, University Entry, and Elite University Enrolment of Australian Youth. Journal of Youth and Adolescence, 45(6), 1156–1175. https://doi.org/10.1007/s10964-015-0386-x

Peck, J. (2005). Struggling with the Creative Class. International Journal of Urban and Regional Research, 29(4), 740–770. https://doi.org/10.1111/j.1468-2427.2005.00620.x

Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., Krabel, S., Kitson, M., Llerena, P., Lissoni, F., Salter, A., & Sobrero, M. (2013). Academic engagement and commercialisation: A review of the literature on university–industry relations. Research Policy, 42(2), 423–442. https://doi.org/10.1016/j.respol.2012.09.007

Phillips, P. W. B., & Webb, G. (2014). 8 Talent, Tolerance, and Community in Saskatoon. In J. Grant (Ed.), Seeking Talent for Creative Cities (pp. 159–177). University of Toronto Press. https://doi.org/10.3138/9781442667938-013

Polese, M., & Shearmur, R. (2006). Why some regions will decline: A Canadian case study with thoughts on local development strategies*. Papers in Regional Science, 85(1), 23–46. https://doi.org/10.1111/j.1435-5957.2006.00024.x

Poschke, M. (2013). Who becomes an entrepreneur? Labor market prospects and occupational choice. Journal of Economic Dynamics and Control, 37(3), 693–710. https://doi.org/10.1016/j.jedc.2012.11.003

Ravenstein, E. G (1885). "The laws of migration." Journal of the statistical society of London 48(2):

167-235

Reese, L. (2012). CREATIVE CLASS OR PROCREATIVE CLASS: IMPLICATIONS FOR LOCAL ECONOMIC DEVELOPMENT POLICY. Theoretical & Empirical Researches in Urban Management, 7(1). http://um.ase.ro/no71/1.pdf

Rehák, Š., & Eriksson, R. (2020). Migration of university graduates and structural aspects of regional higher education. European Planning Studies, 28(10), 1941–1959. https://doi.org/10.1080/09654313.2019.1700483

Richard Shearmur. (2007). The new knowledge aristocracy: The creative class, mobility and urban growth. Work Organisation, Labour and Globalisation, 1(1). https://doi.org/10.13169/workorgalaboglob.1.1.0031

Robichaud, A. (2014). Youth attraction & retention in Northeastern Ontario: A regional strategy. Papers in Canadian Economic Development, 13, 66–88.

Rodríguez-Pose, A. (2013). Do Institutions Matter for Regional Development? Regional Studies, 47(7), 1034–1047. https://doi.org/10.1080/00343404.2012.748978

Saarivirta, T., & Consoli, D. (2007). Where Did They Go? A Study on Newly Established Universities and Graduate Mobility in Finland. https://mpra.ub.uni-muenchen.de/id/eprint/11377

Sá, C., Florax, R. J. G. M., & Rietveld, P. (2004). Determinants of the Regional Demand for Higher Education in The Netherlands: A Gravity Model Approach. Regional Studies, 38(4), 375–392. https://doi.org/10.1080/03434002000213905

Smith, H. L., & Bagchi-Sen, S. (2010). Triple helix and regional development: A perspective from Oxfordshire in the UK. Technology Analysis & Strategic Management, 22(7), 805–818. https://doi.org/10.1080/09537325.2010.511143

SREDA (2020) Growing Together :A Vision for Saskatoon in the new economy https://sreda.com/wp-content/uploads/2020/03/Growth-Vision_online-PDF-2.pdf Accessed October 2,2024

Statistics Canada (2017) 2016 Census: 150 years of urbanization in Canada. [Online]. 2018. Available at: https://www.statcan.gc.ca/en/sc/video/2016census _150yearsurbanization (Accessed: June 26 2024).

Statistics Canada (2015) Canadian postsecondary enrolments and graduates,2013/14 https://www150.statcan.gc.ca/n1/daily-quotidien/151130/dq151130d-eng.htm (Accessed March,7 2024)

Statistics Canada (2016) Focus on Geography Series, 2016 Census https://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/select-Geo-Choix.cfm?Lang=Eng&GK=CMA&TOPIC=1

Statistics Canada (n.d) Postsecondary Student Information System. Code Book. Data Dictionary

Stephens, H. M. (2019). Understanding US college graduate migration. Journal of Geographical Systems, 21(4), 509–531. https://doi.org/10.1007/s10109-019-00310-5

Stillwell, J., & Congdon, P. (1991). Migration models : macro and micro approaches. Belhaven Press.

Storper, M., & Scott, A. J. (2009). Rethinking human capital, creativity and urban growth. Journal of Economic Geography, 9(2), 147–167.

Stroope, S., Franzen, A. B., Tolbert, C. M., & Mencken, F. C. (2014). College Graduates, Local Retailers, and Community Belonging in the United States. Sociological Spectrum, 34(2), 143–162. https://doi.org/10.1080/02732173.2014.878612

Tassonyi, A. T. (2017). The context and challenges for Canada's mid-sized cities. SPP Research Paper No, 10(9). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2997146

Turcotte, M. (2006). Parents with adult children living at home. Canadian Social Trends, 11.

Turcotte, M. and Weeks, J. (2014), 'The migration of infrastructure tradespersons', Statistics Canada, Catalogue No 75-006-X29 p. Science, Technology and Industry Working Paper Series, no. 2010/4.

Uplook (2024) An Action Plan for our economy: 2024 Annual progress report https://www.calgaryeconomicdevelopment.com/assets/Reports/Uplook/Uplook-2024-Progress-report-web.pdf Accessed October 3,2024

Valero, A., & Van Reenen, J. (2019). The economic impact of universities: Evidence from across the globe. Economics of Education Review, 68, 53–67.

Vancouver Economic Commission (2011) The Vancouver Economic Action Strategy: An Economic Development Plans for the City https://vancouver.ca/files/cov/vancouver-economic-action-strategy.pdf Accessed October 4, 2024

Vazzana, C. M., & Rudi-Polloshka, J. (2019). Appalachia Has Got Talent, But Why Does It Flow Away? A Study on the Determinants of Brain Drain From Rural USA. Economic Development Quarterly, 33(3), 220–233. https://doi.org/10.1177/0891242419844320

Venhorst, V., Van Dijk, J., & Van Wissen, L. (2011). An Analysis of Trends in Spatial Mobility of Dutch Graduates. Spatial Economic Analysis, 6(1), 57–82. https://doi.org/10.1080/17421772.2010.540033

Venhorst, V., Van Dijk, J., & Van Wissen, L. (2010). DO THE BEST GRADUATES LEAVE THE PERIPHERAL AREAS OF THE NETHERLANDS? Tijdschrift Voor Economische En Sociale Geografie, 101(5), 521–537. https://doi.org/10.1111/j.1467-9663.2010.00629.x

Ville de Montreal (2024) 2024-2026 Strategic Plan Tourisme/Montreal https://dam.mtl.org/m/63df552ffd7a2b0e/original/Plan-Strategique-24-26-English.pdf Accessed October 4,2024

Vitálišová, K., Vaňová, A., & Šúrová, J. (2020). How to Attract and Retain Creative Class. NISPAcee Journal of Public Administration and Policy, 13(1), 245–266. https://doi.org/10.2478/nispa-2020-0010

Waterloo Region (2014) Economic Development Strategy https://www.regionofwaterloo.ca/en/resources/waterloo-region-economic-development-strategy-access.pdf Accessed October 3,2024

Whisler, R. L., Waldorf, B. S., Mulligan, G. F., & Plane, D. A. (2008). Quality of Life and the Migration of the College-Educated: A Life-Course Approach. Growth and Change, 39(1), 58–94. https://doi.org/10.1111/j.1468-2257.2007.00405.x

Wilson, T. (2015). The impact of education-bound mobility on inter-regional migration age profiles in Australia. Applied Spatial Analysis and Policy, 8(4), 371–391. https://doi.org/10.1007/s12061-014-9124-0

Winters, J. V. (2011). Human Capital and Population Growth in Nonmetropolitan U.S. Counties: The Importance of College Student Migration. Economic Development Quarterly, 25(4), 353–365. https://doi.org/10.1177/0891242411418221

Winters, J. V. (2012). Differences in employment outcomes for college town stayers and leavers. IZA Journal of Migration, 1(1), 11. https://doi.org/10.1186/2193-9039-1-11

Wood, D., Gura, A. Z., & Brockman, J. (2020). Critical Findings in the Development of the Community-Engaged Educational Ecosystem—Asee's Virtual Conference. https://www.google.com/search?q=Critical+Findings+in+the+Development+of+the+Community-Engaged+Educational+Ecosystem&rlz=1C1CHBF_enCA1028CA1028&oq=Critical+Findings+in+the+Development+of+the+Community-Engaged+Educational+Ecosystem&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIGCAEQRRg8MgYIAhBFGDwyBggDEEUYPNIBCDEwMDFqMGo0qAIAsAIB&sourceid=chrome&ie=UTF-8

WPH (2023) Local Labour Market Plan https://www.workforceplanninghamilton.ca/wp-content/uploads/2024/02/2023-2024-Local-Labour-Market-Plan.pdf

Wright, R., & Ellis, M. (2019). Where science, technology, engineering, and mathematics (STEM) graduates move: Human capital, employment patterns, and interstate migration in the United States. Population, Space and Place, 25(4), e2224. https://doi.org/10.1002/psp.2224

Zarifa, D., Seward, B., & Milian, R. P. (2019). Location, location, location: Examining the rural-urban skills gap in Canada. Journal of Rural Studies, 72, 252–263. https://doi.org/10.1016/j.jrurstud.2019.10.032

Zhao, K., Zhang, Y., & Zhao, J. (2020). Exploring the Complexity of Location Choices of the Creative Class in Europe: Evidence from the EU Labor Force Survey 1995–2010. Sustainability, 12(4), 1687. https://doi.org/10.3390/su12041687

Zipf, G. K. (1946). The P 1 P 2/D hypothesis: On the intercity movement of persons. American Sociological Review, 11(6), 677–686.

Appendices

Appendix A: Full matrix of tax year 2016 of all cohorts of graduates from 2013, 2014 and 2015 from across Canada (representing a year after the last cohort graduated)

	Toronto	Montreal	Ottawa	Vancouver	Calgary	Edmonton	Winnipeg	Saskatoon	London	KCW	Guelph	Hamilton	St.Catharines	Oshawa	Halifax	Barrie	Peterborough	Kingston	Greater Sudbury	Quebec	Windsor	Regina	Sherbrooke	Trois Rivieres	Saguenay	Kelowna	Thunder Bay	Victoria	Abbotsford Mission	Moncton	Brantford	St. John's	Saint John(New Brunswick)
Toronto	32740	230	460	520	480	540	140	50	270	470	270	1290	310	630	120	250	90	100	60	10	100	60				30	40	40	30	10	120	30	20
Montreal	520	21240	280	140	80	60	10		20	10	20	20	30	50	20	40												20			20		
Ottawa	620	590	6630	80	70	90	20		30	40		80			40													20					
Vancou	390	70	80	10600	290	180	70	50	20	10	20	30	30	20	40													280					

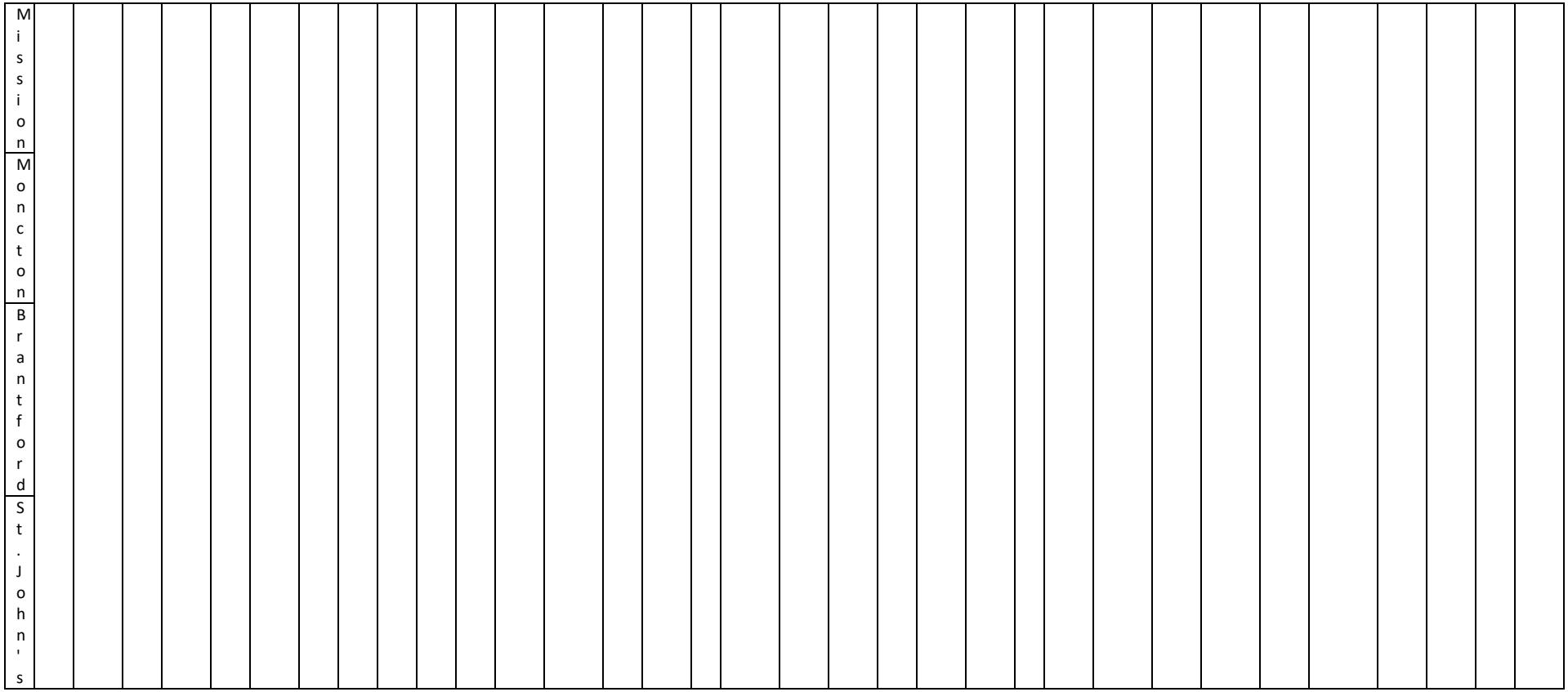
ver																																				
Calgary	140	20	30	90	5980	280	30	50	10	20	10	20			30														30						
Edmonton	100		20	80	220	4610	30	40	20						20														20						
Winnipeg	100	20	30	60	60	50	4700	10		20		10																	10						
Saskatoon	60	10	20	50	70	50	40	1450	10			10																								
London	16220	40	100	110	120	80	40		2910	250	90	210	80	80	40	40																	90			

KCW	1540	30	100	70	70	40	30	30	100	2100	360	150	50	40		20	70	180	140	360	180	1020	150	80	80	190	70	40	310	50	120	60	30
Guelph	360		30	20	10				30	60	160	70	20	20		20				30			50								100		
Hamilton	840	20	40	60	30	40			60	130	70	2580	160	30	10	20															350		
St. Catharines	950	50	40	130	130	160	40	20	70	80	30	370	1930	40	50	30															50		
Oshawa	1500		40	10	20	40																											
Halif	190		50	60	130	70																											

ax																																		
Barrie	700		30	20	30	40																											
Peterborough	610		90	20	40	40																											
Kingston	870		250	70	90	60																											
GreaterSudbury	360		80	70	40	30																											

Quebec			160	20	20	90																													
Windsor																																			
Regina																																			
Sherbrooke																																			
TroisRivieres																																			

Saguenay	Kelowna	Thunder Bay	Victoria	Abbotsford
640	2570	190	820	310
180	110	70	270	290
120	310	150	2250	2400
960	770	780	1110	3930
1530	200	930	620	620
1040	980	1210	480	130
100	400	40		


Mission
Moncton
Brantford
St. John's

Appendix B: Full matrix of tax year 2019 of all cohorts of graduates from 2013, 2014 and 2015 from across Canada (representing 4 years after the last cohort graduated)

	Toronto	Montreal	Ottawa	Vancouver	Calgary	Edmonton	Winnipeg	Saskatoon	London	KCW	Guelph	Hamilton	St. Catharines	Oshawa	Halifax	Barrie	Peterborough	Kingston	Greater Sudbury	Quebec	Windsor	Regina	Sherbrooke	Trois Rivieres	Saguenay	Kelowna	Thunder Bay	Victoria	Abbotsford Mission	Moncton	Brantford	St. John's	Saint John(New Brunswick)
Toronto	31330	290	540	590	490	510	110	40	330	600	310	1440	340	790	120	320	100	100	60		120	40				20	50	60	30	20	15 0	30	20
Montreal	530	2412 0	370	160	80	50	20	20	10	20	20	30	40	10	30	40												10					
Ottawa	580	640	634 0	110	80	80	20		30	30		80		50	50													20					

Vancouver	470	80	70	94000	300	1900	80	50	30	20	10	40	40	30	30														300								
Calgary	170	20	40	140	5650	20	30	40	10	20	20	30			30														30								
Edmonton	130	20	30	100	240	4300	30	50	20						30														30								
Winnipeg	170	30	50	110	100	50	4330	10		20		20																	20								
Saskatoon	90	20	30	50	110	70	40	1390	10																												
London	1600	50	140	110	120	80	30	20	2720	270	80	240	70	70	40	40																					

KCW	1370	40	120	80	70	50	40		110	1900	340	170	50	40	20	20	80	200	80	460	180	960	190	110	70	240	90	50	330	60	220	70	40		
Guelph	300		30	20	10				30	50	120	60	10	10		10																			
Hamilton	770	20	50	40	40	40			70	160	60	2360	170	30		20															390				
St.Catharines	890	40	60	110	150	150	30	20	90	100	30	350	1780	50	50	30															70				
Oshawa	1440		60	20	30	30																													
Halifax	210		60	70	110	70																													
Barrie	660		40	20	40	40																													

Peterborough	580		110	30	40	30																												
Kingston	800		280	70	90	60																												
GreaterSudbury	300		100	60	50	30																												
Quebec			180	30		80																												
Windsor																																		
Regina																																		
Sh																																		

erbrooke																																
Trois Rivieres	520																															
Saguenay		2720	180	840	310	160	100	90	220	340	140	340	140	2150	2280	900	750	730	1080	4410	1430	240	1000	690	650	990	950	1040	420	130	100	350	60
Kelowna																																
Thunder Bay																																
Victoria																																
Abb																																

otsford Mission																																	
Moncton																																	
Brantford																																	
St. John's																																	

Curriculum Vitae

Sangmen Anthony Abbot

Education

MA Geography | 2022-present | University Western Ontario

PROGRAMMING FOR EVERYBODY (GETTING STARTED WITH PYTHON)| AUGUST 2021 | UNIVERSITY OF MICHIGAN, COURSERA

PYTHON DATA STRUCTURES| AUGUST 2021 | UNIVERSITY OF MICHIGAN, COURSERA

INVESTMENT FOUNDATION | JANUARY 2019 | CFA INSTITUTE, USA

BSc Land Economy | July 2017 | Kwame Nkrumah university of science and Technology (KNUST)

Skills & Abilities

- Geographical Information System (QGIS)
- Python Language
- R

Experience

TEACHING ASSISTANT | DEPARTMENT OF GEOGRAPHY AND ENVIRONMENT | UNIVERSITY OF WESTERN ONTARIO| SEPT 2022-PRESENT

ASSISTANT RESEARCH OFFICER | ASHANTI REGIONAL HOUSE OF CHIEFS UNDER THE MINISTRY OF CHIEFTAINCY AND RELIGIOUS AFFAIRS| OCT 2020-2022

ASSISTANT PLANNING OFFICER| BEREKUM EAST MUNICIPAL ASSEMBLY UNDER LOCAL GOVERNMENT SERVICE |OCT 2019-SEPT 2020

TEACHER | KWABENYA COMMUNITY SENIOR HIGH SCHOOL| NOV 2018-SEPT 2019

Conference

PROJECT COORDINATOR AND RESEARCH ASSISTANT|Precarious housing: governance and policy responses to the Canadian housing crisis| AUGUST-NOVEMBER 2023